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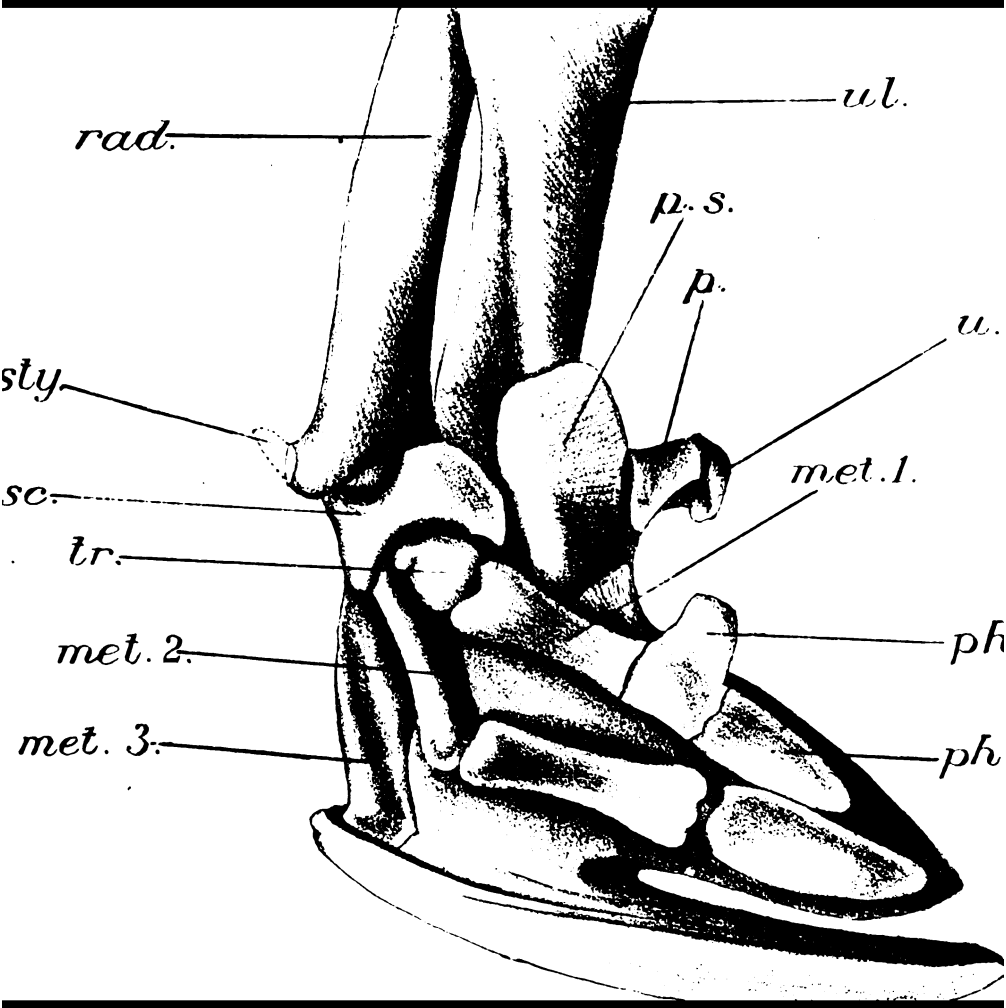

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TRANSACTIONS

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XVIII., for 1893-94.

[With Fifteen Plates.]

INCLUDING PROCEEDINGS AND REPORTS.

EDITED BY MR. HOWCHIN AND PROFESSOR TATE.

ISSUED NOVEMBER, 1894.

Adelaide:

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Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

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Supplemental Note on the Osteology of Notoryctes Typhlops.

By E. C. Stirling, M.D., F.R.S., Hon. Director South Australian Museum.

Plate I.

In the course of an examination of the muscular system of *Notoryctes typhlops* Professor Wilson has been good enough to point out an error into which I have fallen in my description of the osteology of the manus (Trans. Royal Soc. of S.A., vol. XIV., part I.) in consequence of a small but important bone having been lost in the preparation or manipulation of the dry skeleton on which my observations were based. I take the opportunity of the publication of the first part of his paper on the "Myology of *Notoryctes*" as convenient for the correction of the error.

In the account referred to (p. 176, and Plate viii., fig. 5) I describe the pollex as consisting of two segments only, of which the proximal is attached by ligamentous connections to the metacarpal of the second digit as well as to the proximal phalanx of the latter. Being desirous of not mutilating other specimens, then as even now rare, I abstained from substantiating the existence of this obviously peculiar arrangement by reference to other dissections, but an examination of Professor Wilson's specimen as well as of another in which the bony relations have been left undisturbed leaves no doubt but that an additional carpal bone exists of which, for the reason stated, I made no mention.

In the light of this re-examination, it appears that the proximal element of the pollex is a small nodular bone about the size of a large pin's head, which articulates with the relatively large scapho-carpal. It is this bone, clearly a trapezium, which was missing in my original dry specimen (pl. i., figs. 1 and 2 *tr*). Allowing for the existence of this important element, an inspection of Prof. Wilson's specimen requires a further emendation of the constitution of the remainder of this digit as stated by me. Examination of his specimen shows that the proximal of the two segments which, by themselves in my description, constituted the pollex, shows a division into two parts—one an elongated bone articulating with the trapezium (pl. i., fig. 1, *met.* 1), the distal shorter and bearing a well-marked process radially directed (pl. i., fig. 1, *ph. prox.*). Even in Professor Wilson's specimen the division between these two bones is indistinct, and on referring to my own specimen I can find no trace of such separation, the two bones being fused into a simple segment. The radial process, however, on the distal element is clearly shown in my sketch. Lastly follows the ungual phalanx, which is less clearly shown to be a separate bone in Professor Wilson's specimen than in mine own. If, then, as seems clear, we are to

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regard the proximal element of the digit as a trapezium, the scapho-carpal does not represent all the carpalia, and the pollex becomes of normal constitution, possessing its carpal, metacarpal segments and two phalanges.

There seems, in fact, to be a marked tendency to synostosis of the bones of the manus, for in my original specimen it certainly appeared as if the elements of the fifth digit were reduced to two, a proximal, described as a metacarpal which (with the pisiform) supported the ungual phalanx. In Professor Wilson's specimen a division of this supposed metacarpal into two is certainly, if indistinctly, indicated. This arrangement, of course, provides for the fifth digit a metacarpal and two phalangeal segments. No trace of such division, however, was visible in my original specimen, or in another which I have since examined.

In the latter specimen there is complete synostosis of the ungual phalanges of the pollex and index of one manus, and almost complete fusion of their respective claws (fig. 2). On the other side no such fusion occurs. As further evidence of this tendency to synostosis in other parts of the skeleton, beyond the facts already mentioned, it is worthy of note that, in Professor Wilson's specimen, the styloid process of the radius is completely separate, whereas it is firmly ankylosed in my two skeletons. So also in the first rib he finds on one side well-marked evidence of a synchondrosis between the broad expanded sternal end and the more rod-like vertebral moiety. This is not nearly so well marked on the other side, and is not perceptible at all in my specimens. This synchondrosis evidently indicates the fusion of two distinct osseous elements, of which the ventral doubtless represents a sternal rib.

EXPLANATION OF PLATE I.

FIGURES.

1. *Notoryctes typhlops.* Right manus, palmar aspect (x 4).
   - *ul*, ulna.
   - *rad*, radius.
   - *sty*, styloid process of radius (separable).
   - *sc*, scapho-carpal.
   - *tr*, trapezium.
   - *met* (1), Metacarpal of pollex.
   - *met* (2), " " second digit.
   - *met* (3), " " third "
   - *ph prox*, proximal phalanx of pollex.
   - *ph dist*, distal phalanx of pollex.
   - *p s*, palmar sesamoid.
   - *p*, pisiform.
   - *u*, ungual phalanx of fifth digit.

2. *Notoryctes typhlops.* Right manus, palmar aspect (another specimen).
   - *a*, ankylosed ungual phalanges of pollex and second digit.
   - *b*, claws similarly fused.

   Other references the same as in fig. 1.

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On the Myology of Notoryctes Typhlops, with Comparative Notes.

By J. T. Wilson, M.B., Edin., Professor of Anatomy, University of Sydney, N.S.W.

Plates II. to XV.

Part I.

Out of the very limited number of specimens of this interesting marsupial which had come into his possession Dr. E. C. Stirling very kindly placed one at my disposal for the purpose of investigating its myology. The specimen thus obtained measured 115 mm. from the tip of the snout to the tip of the tail, the measurement being taken along the slight curve of the back. It was of the female sex. The abdominal viscera had been removed through an incision in the anterior abdominal wall.

Dr. Stirling was also good enough to afford me an opportunity of studying the partially disarticulated skeleton (imperfect) of another specimen, and this along with his own excellent descriptions and figures enabled me to acquire the necessary familiarity with the osseous system.

More recently I have been greatly indebted to Professor Baldwin Spencer, of the University of Melbourne, for permission to examine the greater part of the muscular system of another (male) specimen, a permission generously granted at the kind suggestion of my colleague, Professor W. A. Haswell.

More recently still Professor Spencer has placed another specimen at my disposal for the purpose of following out the peripheral nerves more satisfactorily than has been possible in the single complete specimen from which the following descriptions and figures have been chiefly drawn. The results of such a further examination I hope to embody in a future contribution.

I take this opportunity of thanking Mr. J. J. Fletcher for his kindness in giving me access to a number of papers and specimens in his possession, and Dr. J. Lorrain Smith, of Cambridge, for specimens kindly procured for me in England.

I also wish to express my indebtedness to Mr. G. H. Barrow, lately of the Australian Museum, Sydney, for the care and intelligence with which he has executed the drawings from which this paper is illustrated. The drawing to an accurately enlarged scale of dissections, which were often so minute as to require the constant aid of a lens, was by no means an easy task.

Incidentally, I may mention that I carefully examined the marsupium of my specimen. Its hinder limit was 8 mm. in front

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of the cloacal aperture. Its interior was lined with hair opposite the vestibule of the pouch, but throughout the anteriorly directed fundus hairs were very sparsely distributed.

The fundus possessed slight lateral recesses, within which the sparse hairs were larger. The position and appearance of the mammae on the dorsal wall of the pouch opposite the entrances to the lateral recesses corresponded accurately with those recorded in Dr. Stirling's later paper in the Transactions of this Society of date October 6th, 1891.*

In view of the numerous rather anomalous features in the organisation of *Notoryctes*, and the doubts which have occasionally been expressed as to its exact systematic position and affinities, I have thought it advisable while recording the arrangements of its muscles to aim at providing for a morphological comparison between these muscles and those of other forms. This I have striven to do largely by citation from the abundant records of mammalian myology, supplemented in certain cases, more particularly in Monotremes and some Marsupials, by the results of my own examinations. Naturally, the records of the comparative myology of the *Marsupialia* have demanded the most careful scrutiny. The other orders to whose myology I have devoted some attention are the *Monotremata*, *Edentata*, *Insectivora*, *Rodentia*, and *Carnivora*.

I must, however, disclaim any idea of making an attempt at giving anything like a complete acconnt of the muscular morphology, either of these orders themselves or of individual members of them. With this important reservation, the notes may yet serve a useful purpose in illustrating the comparative anatomy of the muscles of *Notoryctes*, especially as I have paid more particular attention to those types in the various orders *(a)* whose *functional* organisation is presumably not widely dissimilar from that of *Notoryctes—e.g.*, *Talpa europea—(b)* which offer certain remarkable points of structural resemblance—*e.g.*, *Chlamydophorus*.

I greatly regret that I have had no opportunity of dissecting a specimen of that interestiug insectivore the Cape Golden Mole *(Chrysochloris)*, which would come under both of the above categories. My knowledge of the muscular anatomy of this animal has accordingly been derived from Leche's notes in Bronn's "Klassen und Ordnungen" (Sechster Band Abt. V.), which appear to have been derived from Dobson's "Monograph of the Insectivora," Pts. I. and II., to which I have been unable to refer.

In studying the myology of a specially modified member of a

* lv., page 286.

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group, the attempt to ascertain the homologies of its muscles to those of other forms may be rendered difficult through a confusion between muscular segmentation dependent upon mere functional modification of the species and that more fundamental segmentation into muscle-fibre-groups which, while not independent of function, is yet the expression of definite morphological type.

In the section of work now presented I have not found this difficulty to offer any insuperable obstacle to a quite intelligible reading of the muscular arrangements in *Notoryctes*. In spite of its specialised structure, indeed, the muscular organisation of this animal bears very evident traces of its affinity to other more or less allied forms; and although there can be no doubt that the marsupial type is the prevalent one, there are features, for a structural parallel to which one must go outside the limits of the *Marsupialia*. And I cannot avoid the conclusion that the structural resemblances in particular to certain members of the order *Edentata* are not all to be explained as merely the coincidences of somewhat similar functional modifications, but are the enduring evidences of a real if distant morphological kinship.

Neither in *Talpa* nor, apparently, in *Chrysochloris* do we find any such striking similarities to *Notoryctes* as we do, for example, in *Chlamydophorus*; and this in spite of the fact that the habit of life of the first-named animals is probably much more like that of *Notoryctes* than is that of *Chlamydophorus*. So far as I can judge from my very limited acquaintance with the myology of *Chrysochloris*, the muscles of the anterior limb of that animal are far less like those of *Notoryctes* than at least a superficial comparison of the skeletons would lead one to expect.

M. panniculus.

The subcutaneous sheet of the *panniculus carnosus* on the ventrolateral aspect of the body consists mainly of three systems of fibres—*(a)* a platysma system ventrad of the neck and chest, *(b)* a humeral system passing transversely and obliquely outwards on the ventral aspect of the thorax and abdomen to the region of the axilla (fig. 1, *p. c.*), and *(c)* a system of longitudinal and oblique fibres crossing backwards from amongst the other abdominal fibres to the region of the marsupium which some surround, whilst others enter and end in the folds of skin forming the margin of the opening of the pouch *(sphincter marsupii)*. This system of longitudinal fibres is lost posteriorly in the region of the cloacal aperture and root of the tail, whilst its more lateral portion is continued over the front of the inguinal and femoral regions *(abdominis femoralis)*. On the dorsal aspect of the

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head and neck the panniculus is inseparable from or replaced by the somewhat extensive cervico-auricularis described below.

A well-marked "*ischiotergal*" slip is attached posteriorly to the outer aspect of the ischium near its tuberosity, and passes forwards to be inserted into the skin of the back in the lumbar region. I find no record of such a specialised slip in any other marsupial, nor is it present as such in the monotremes. It is absent in *Talpa*. I have named it "*ischiotergal*" after an apparenly similar slip described by Macalister* in *Tatusia*.

The comparatively meagre development of the panniculus stratum in *Notoryctes* is worthy of remark. In its degree of development and differentiation it is slight, slighter than is usual amongst marsupials, and far inferior to the corresponding stratum in monotremes and insectivores, in which an extensive development of the sheet is found, *e.g.*, in *Ornithorhynchus* or in *Talpa* or *Chrysochloris*—animals which are just as destitute of special dermal movable structures.

Some of the *Edentata*, *e.g.*, most Armadilloes, have well-developed skin muscles, but in others, and especially in *Chlamydophorus*, the sheet is only feebly developed, and not well differentiated.

M. cervico-auricularis (figs. 1, 4, and 5 *r.a.*) is a well marked sheet of muscle, extending from the mesio-dorsal line of the head and neck outwards to the distal end of the long tubular auditory meatus, into the dorsal aspect of which it is inserted, its anterior fibres mingling with those of the special attrahens aurem (figs. 2 and 3*q*). Its anterior border reaches the parietal and frontal regions, whence its fibres are directed backwards and outwards, converging to the meatus. Anteriorly it is closely related to the integument of the scalp, while its transverse posterior border behind the occiput is free.

It overlaps the whole of the cleido-trapezius and delto-trapezius elements of the subjacent sheet. Many of its fibres have an almost antero-posterior direction, and a decussation of these with the transverse fibres is observable.

M. attrahens aurem seu mandibulo-auricularis, a narrow, ribbon-like muscle (figs. 2 and 3*a.a.*), arising from the lateral aspect of the ascending ramus of the mandible, just behind the insertion of the temporal muscle, by a narrow tendinous origin, which is overlapped by the hinder border of the masseter. Its fibres are directed outwards and dorsally, parallel with, and close in front of, the tubular auditory meatus, to the distal extremity of which some of its fibres are inserted, the remainder decussating and mingling with the fibres of the cervico-auricularis.

Cervico-auricularis seems to be the representative of conjoint attollens and retrahens aurem muscles, at least, and part of it corresponds to the auriculo-occipitalis of Ruge.

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* xxvii., page 227.

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Not unlikely, it also represents other cervical and cephalic portions of the panniculus, *i.e.*, elements of the "subcutaneus colli" layer of the "superficial brachio-cephalic stratum" of Humphry*.

In *Myrmecobius* Leche† describes two layers of auriculo-occipitalis fibres, of which the deeper were directed forwards from the ligamentum nuchae towards the anterior basal part of the ear, and partly to the upper orbital border, while the more superficial fibres passed directly outwards from the mid-occipital line to unite with the other fibres in the auricle.

In *Phascogale* the same observer describes an auriculo-occipitalis consisting of several slips, of which the anterior passed forwards into the frontal region beneath the auricularis superior, while three slips passed transversely outwards to the auricle.

It may be that the hinder part of the M. auricularis superior of this animal‡ is represented by part of the anterior fibres of the cervico-auricularis of *Notoryctes*.

Attrahens (mandibulo-auricularis) present in both the above animals.§

In Koala|| Macalister found a thin and wide attollens and a strong bilaminar retrahens, which came from the occipital protuberance. He also found two attrahens slips, neither of which, however, corresponds to the mandibulo-auricularis of *Notoryctes*.

In *Ornithorhynchus* the ear muscles are not fully differentiated from the cephalic prolongation of the panniculus.¶

In *Chlamydophorus* Macalister** found the ear muscles exceedingly feeble, the attollens and retrahens being hardly represented, while in *Tatusia* the same author found both well developed. The *attrahens* in the former animal was also feebly developed, and arose from the zygomatic arch.

Humphry found in *Orycteropus*†† a large retrahens, continuous with an attollens, all the fibres converging to the ear, and an attrahens arising by three origins, of which the first exactly corresponds to the origin from the mandible in *Notoryctes*.

Auricular muscles in the Insectivora are well developed in accordance with the great specialisation of the subcutaneous muscles generally. Both in *Chrysochloris* and the *Talpidae*‡‡ they include occipito-cuticularis and cervico-auricularis sheets, both of which are inserted into the auricle; and a cervico-cuticularis may also in part *(Gymnura)* possess a similar attachment.

That muscular system or stratum of fibres which in man is represented by the *trapezius* and *sterno-cleido-mastoid* muscles, with occasional intermediate slips, consists, according to Macalister,§§ of the following elements:—"*Trapezius, acromio-trachelien, cleido-occipital, cleido-mastoid, sterno-mastoid,* &c."

Only the trapezial and sterno-mastoid portions are with certainty present in *Notoryctes*, but the trapezial system of fibres

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* xx., page 133. † xxvi., page 674. ‡ xxvi., page 678, and Taf. xcviii., fig. 2. § xxvi., page 683, and Taf. xcviii., fig. 2. || xxviii., page 128. ¶ xxxvii., Tab. vi. ** xxvii., page 229. †† xxi., page 295. ‡‡ xxvi., pages 663 and 679. §§ xxvii., page 238.

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consists of the following recognisable elements:—1, *M. cleido-trapezius* (figs. 1 and 3 *c.t.*); 2, *M. delto-trapezius* (fig. 1 *d.t.*); 3, *M. acromio-trapezius* (figs. 1, 4, and 5 *a.t.*); and 4, *M. spino-trapezius* (figs. 1, 4, and 5 *s.t.*).

Of these, the first two are semi-conjoint (figs. 4 and 5 *c.d.t.*), while the last two are distinct muscles (figs. 1, 4, and 5, *a.t.* and *s.t.*).

The first, preaxial and ventral, segment or *cleido-trapezius*, is separated by a preclavicular, narrow, triangular area from the sterno-mastoid muscle (figs. 2, 3, and 5 *s.m.*). It is only separate from the second, or delto-trapezius, for a short distance in front of, and ventral to, the shoulder. The conjoint muscle arises from part of the *crista lambdoidalis* or *occipitalis*, described by Stirling* as "running forwards and outwards, and then downwards from the occipital tubercle till it becomes continuous with the upper edge of the zygoma." This ridge in its outer vertical part bounds the temporal fossa posteriorly, whilst its horizontal inner part, forming the "superior curved line," or nuchal crest of the occiput, gives origin to the muscle under notice as far forwards as the temporal fossa. It also arises from the ligamentum nuchæ for 3 or 4 mm. backwards from the occipital tubercle. The fibres are at first directed transversely across the neck, covered by the cervico-auricularis. Just behind the auricle the fibres sweep backwards, becoming at the same time segmented into the two component parts (figs. 2 and 5, *c.t.* and *d.t.*).

The ventral, or cleido-trapezial, part now courses beneath the shoulder backwards to its attachment to the clavicle, not far from the meso-scapular extremity of that bone (fig. 3, *c.t.*).

The delto-trapezial, more dorsal moiety ("trapezio-deltoid," "cephalo humeral muscle") covers the ventral aspect of the acromion and meso-scapular segment (also overlapping the distal half of the acromion laterally), and is then continued on, between the scapulo- or spino- and cleido-deltoids, becoming more or less united with them, towards a common insertion.

M. acromio-trapezius (figs. 1, 4, and 5, *a.t.*) forms a transverse, almost rectangular, band of fleshy fibres, whose anterior border is closely related to the posterior border of the preceding muscle, arising mesially from the ligamentum nuchæ immediately behind the delto-trapezius, and extending as far back as the first dorsal spine, where it ends, leaving a free hinder margin. Its fibres pass laterally, to be inserted into the dorsal surfaces of the meso-scapular spine and the proximal half of the acromion, partly concealing the attachment to the pre-axial lips of the same parts, of the extensive subjacent rhomboideus (figs. 1 and 4 *rh.*).

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* liv., 162.

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M. spino-trapezius (figs. 1, 4, and 5, *s.t.*), the caudal sector of the trapezial system, is separated by a considerable gap from the preceding, and, in the interval between them, portions of the Mm. latissimus dorsi and rhomboideus come into view. It arises from the tips of the spines of the seventh to the eleventh dorsal vertebræ (inclusive), and from the supra-spinous ligament, and it forms an elongated ribbon-like band, directed obliquely forwards and outwards, to be inserted into the post-axial lip of the scapular spine, chiefly into a prominence of the same, which overhangs the post-scapular fossa.

This strap-like muscle crosses the latissimus dorsi obliquely, and is supplied from the brachial plexus via the axilla, and posterior to the scapula, by a nerve, which also supplies the latissimus dorsi.

This entire separation of the posterior segment of the trapezius sheet, both in origin and insertion, from the more anterior fibres, is quite unusual amongst marsupials; in fact, I have neither observed, nor found any record of, such an arrangement in any other member of the order.

The *trapezius* indeed in marsupials generally forms, as stated by Cunningham* for the three forms described by him, "an unbroken muscular sheet," at least so far as the origin is concerned. Macalister,† however, reports, that in *Sarcophilus* "the part of the muscle corresponding to the root of the spine of the scapula was weak and tendinous, and nearly divided the fleshy part into an upper and a lower trapezius; however, a thin muscular margin near the spines of the vertebræ saved it from this division."

In the Monotremes‡ the posterior part of the muscle is quite separated from the anterior by a wide gap, the posterior part of the trapezius arising from the hinder ribs and vertebræ, and running forward to be inserted into the "anterior" or spinous border of the scapula near its basal end. (In *Echidna* also into the dorsal border.)

A similar isolation of the posterior occurs in some of the *Edentata*, notably in *Chlamydophorus*§ and in the armadillos generally.‖ It arises in *Chlamydophorus* from the anterior dorsal vertebræ, and is inserted into the scapular spine.

The division is universal in the *Insectivora*,¶ the hinder part (spino-trapezius) being inserted into the posterior end of the scapular spine.

Mivart and Murie** describe the division also in the Agouti, where it is also figured by Cuvier and Laurillard,†† and it occurs in other rodents, *e.g.*, the Rabbit.

I find on dissection that the spino-trapezius in *Talpa* is innervated *via* the axilla, as in *Notoryctes*.

A tripartite division of the trapezius sheet exists in the cat,‡‡ in *Ursus americanus*,§§ and in *Hyæna*,‖‖ and in the *Carnivora* generally the spino-trapezius is differentiated.

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* iv., page 2. † xxix., page 154. ‡ xxxvii., page 23, and vi. Pl., 265. fig. 2, and xxxix., page 379, and lxii., page 12. § xxvii., page 234. ‖ lvi., page 92. ¶ xxvi., page 720. ** xl., page 393. †† vi. Pl., 245. ‡‡ lxiii., page 212, and lvi., page 93. §§ lvi., page 93, and vi. Pl., 81-2. ‖‖ vi. Pl., 129-30.

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In the Cat the three sectors correspond to the cleido- acromio- and spino-trapezius of *Notoryctes* (*i.e.*, the clavo-acromio- and dorso-cucullaris of Strauss-Durckheim). The fibres I have named "delto-trapezius" are simply "cephalo-humeral" fibres belonging to the claricular system of trapezius fibres.

I am doubtful whether the segment described above as cleido-trapezius is or is not to be regarded as the equivalent of a cleido-occipital. A muscle corresponding to the latter is otherwise absent, but a cleido-trapezius very like that in *Notoryctes* occasionally co-exists with a true cleido-occipital, *e.g.*, in Koala,* Cuscus,† *Phalangista vulpina*,‡ amongst other marsupials.§ The origin of the trapezius sheet in this order varies chiefly in the number of dorsal spines which give it origin, *e.g.*, from all in *Dasyurus*, or only from seven in *Thylacinus*, *Phascogale* and Cuscus, and nine or ten in *Sarcophilus*. It arises from the occipital crest, and ligamentum nuchæ also in most. Its insertion is in all marsupials mainly into the spine or spine and acromion, but the anterior fibres have a variable insertion, and often wholly *(Dasyurus)* or partly *(Phalangista)* form a cephalo-humeral bundle passing, to be inserted along with deltoid, like the delto-trapezius in *Notoryctes*.

In Wombat this anterior part passes over the clavicle and replaces the clavicular part of deltoid, while again in *Sarcophilus* no part of the muscle reaches the humerus, the anterior fibres being inserted into the outer fourth of the clavicle.‖

Macalister's view (adopted by MacCormick for *Dasyurus* and *Phalangista)* that the humeral fibres of the *trapezius* in *Phascolomys* correspond to those of the "cephalo humeral" muscle found in other orders is opposed by Leche¶, but, as it appears to me, on quite insufficient grounds. His argument that in *Dasyurus* and *Myrmecobius* there is a "pars clavicularis deltoidei" independently of the humeral trapezius is sufficiently answered by reference to the conditions in *Phalangista*** and *Phascolomys*, where a part or the whole respectively of the clavicular deltoid is replaced by what are plainly fibres corresponding to the humeral fibres of the trapezius in *Dasyurus*. One need only suppose that the pars clavicularis deltoidei in the latter animal, which is concealed by the humeral slip of the trapezius, answers only to the deeper part of the whole clavicular deltoid.

No corresponding segmentation of the anterior part of the trapezius is present in Monotremes.

In *Echidna*†† the muscle is inserted into part of the dorsal border of the scapula, along the scapular spine, by means of a fibrous arch, and to the acromion and outer part of clavicle. In *Ornithorhynchus* it is inserted into the dorsal scapular margin and the clavicle and inter-clavicle.

Macalister,‡‡ after describing a cleido-occipital in *Chlamydophorus*, and stating that "in no other Edentate does this muscle seem to exist distinctly," goes on to say, "Professor Hyrtl describes a third muscle external to the cleido-mastoid, but much stronger, which ascends with it, and is inserted into the lambdoid suture, and into the temporal

* lxxii., page 222. †iv., page 4. ‡xxxvi., page 104. § vi. Plate, 174 *a*+, and Plate 176, fig. 1., *a*+. ‖ xxix., page 154. ¶ xxvi., page 719. ** xxxvi., fig. 7 *tr.*, and vi. Pl., 177. †† lxii., page 12. ‡‡ xxvii., page 238.

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aponeurosis; this he regards as the separated clavicular trapezius. This muscle was inseparately joined to the rest of the trapezius in mine," &c. The last described portion of the trapezius would appear to correspond to the cleido-trapezius of *Notoryctes*.

The insertion of the anterior trapezius in *Chlamydophorus* and *Tatusia* is into the scapular spine and acromion.

M. rhomboideus (figs. 1 and 4, *rh.*) is a single, very extensive, and thick muscular sheet. It arises in part from the crista occipitalis under cover of the cleido- and delto trapezius, but it extends further ventro-laterally than they do. It also takes origin from the whole of the ligamentum nuchæ under cover of delto- and acromio-trapezius fibres, and from the first two dorsal spines where it is uncovered by any other muscle. Its posterior border is parallel and in apposition with the anterior border of the latissimus dorsi. The fibres of the muscle have a somewhat complicated arrangement. The posterior ones run directly outwards, to be inserted into the vertebral or mesial border of the scapula, The fibres next succeeding (anteriorly) incline slightly backwards, whilst those from the cephalic end of the ligamentum nuchæ, together with the whole of the occipital fibres, sweep almost directly backwards. Of the backwardly-directed fibres, those more dorsally placed are inserted into the vertebral border of the scapula, but less into its mesial *edge* than into the outer surface, or dorso-lateral lip; whilst the more ventrally placed, occipital, fibres are inserted into the preaxial lip of the scapular spine under cover of the acromio-trapezius. (See fig. 4.)

The rhomboideus muscular stratum in *Notoryctes* plainly contains elements of all three portions recognised in certain other forms, *i.e.*, Mm. rhomboideus capitis, rhomboideus major, and rhomb. minor.

For a list of synonyms for the rhomb. capitis reference may be made to Leche's Memoir in Bronn's Thier-reich*

The rhomboid sheet in *Notoryctes* differs from that described in other marsupials, *e.g.*, by Cunningham,* chiefly in the much greater extent of its insertion, which has usurped the whole length of the preaxial lip of the mesoscapular spine. This fact, together with the entire absence of an acromio-trachelien muscle, leads me to suppose that the latter muscle has been absorbed into the rhomboideus, or, rather, has not been segmented off from it. But there is no atloid origin of part of the sheet to indicate such a compound character.

In Cuscus, *Phascogale*, and *Thylacine*†, in Koala‡, and in Wombat§ the rhomboid is undivided and extensive, arising from occipital crest as well as from cervical and dorsal spines, and in all is inserted into the whole length of the base of the scapula; and in each of these animals an acromio-trachelien is present attached, in Wombat, to "outer half of scapular spine," and in Koala, to "one-half of scapular spine."

* xxvi., page 725. † iv., page 3. ‡ xxviii., page 129. § xxix., page 154.

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In *Phascogale** the acromio-trachelien is double, and attached to whole length of scapular spine, the "superior" muscle being united with the margin of the rhomboideus by its upper margin, so that the latter muscle is inserted "to a small extent into the root of the scapular spine." A similar fusion also occurs in *Myrmecobius*.† In Cuscus the acromio-trachelien is also double, and distinct from the single rhomboideus. In *Thylacine* it is single and distinct. In *Sarcophilus*‡ the rhomboideus is distinct from the acromio-trachelien, and is itself divided into "a rhomboideus occipitalis (*i.e.*, capitis), and a proper rhomboid made up of the fused major and minor."

In *Dasyurus viverrinus* and in *Phalangista vulpina* MacCormick§ found the rhomboid extensive and undivided, and inserted into the whole length of the base of the scapula, and also that it "has a small slip inserted into the anterior lip of the spinal crest of the scapula close to the base of the bone above the acromio-trachelien superior, and in a line with it."

Both in *Ornithorhynchus* and *Echidna* the rhomboid is undivided, thick, and strong, its origin reaching in the former from the occipital crest of the dorsal region. In both forms it is inserted into the greater part of the scapular base. Cuvier and Laurillard‖ figure an acromio-trachelien in *Ornithorhynchus* which consists of two distinct parts, described by Meckel¶ under the name of levatores scapulæ. The dorsal part is inserted into the scapular base, the other into acromion and clavicle. Mivart notes the same double muscle in *Echidna* under the name of levator-claviculæ**; also Westling.††

Macalister‡‡ states that in *Dasypus* the acromio-trachelien is supra-occipital in its origin, that in *Pholidotus* it is united with the occipital rhomboid, and that it is absent in *Chlamydophorus*, *Tatusia*, *Cyclothurus*, *Bradypus*, *Choloepus*, in the first two of which the occipital rhomboid extends along the meso-scapular spine.

In reference to the acromio-trachelien muscle, the latter author remarks that "the exact relationship of this muscle to the other shoulder muscles is not very clear; in the largest proportion of mammals it is present, and is atlantic in origin and acromial in insertion, occupying a position beneath the front edge of the trapezius, but most probably, as suggested by many authors, it is a slip of the superficial muscular sheet intermediate between the trapezial and cleido-occipital factors of that expansion. The elements of this sheet seem thus to be trapezius, acromio-trachelien, cleido-occipital, cleido-mastoid, sterno-mastoid," &c. In some cases at least I think we must rather associate the acromio-trachelien with the deeper rhomboid stratum with which it is sometimes (*Pholidotus*) evidently fused, and with a greater extension of which its absence is occasionally associated (*Notoryctes*, *Chlamydophorus*). This relationship is well expressed by Cuvier's appellation of "dorso-trachelien" for the three rhomboid factors and "acromio-trachelien" for the usual omo-atlantic muscle. Leche regards it as akin to the levator-scapulæ group.§§

In *Chrysochloris*‖‖ the acromio-trachelien is present as a double

* iv., page 3. † xxvi., page 726. ‡ xxix., page 154. § xxxvi., page 106. ‖ vi. Pl., 266, fig. 2. ¶ xxxvii., page 23. ** xxxix., page 383. †† lxii., page 13. ‡‡ xxvii., page 238. §§ cf. xxvi., 732. ‖‖ xxvi., page 727 and 733.

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muscle, inserted into mesoscapular spine and metacromion. Here the rhomboid stratum is bilaminar, the superficial lamina extending from crista occipitalis and ligamentum nuchæ to posterior angle of scapula and the deeper from occipital crest to dorsal part of spine of scapula. The part corresponding to the minor rhomboid, however, does not share in this delamination, but is separately segmented off posteriorly, and joins with its fellow of the opposite side to form a muscular band passing between the posterior scapular angles of opposite sides.

In *Talpa* there is only one rhomboid muscle, "probably the representative of the rhomboideus minor of man."*

In most other *Insectivora* the rhomboid consists of two parts—anterior corresponding to rhomboid cap. and rhomboid major, and posterior corresponding to rhomboid minor. Acromiotrachelien is generally single and inserted into acromion or metacromion, in Tenrec and Hedgehog along with trapezius.†

In Agouti, Mivart and Murie‡ describe only "one continuous sheet of rhomboid muscle arising from the paramastoid process of the occiput, the median line of the neck, and the dorsal vertebræ." So also in *Hystrix*.§

In other rodents the three rhomboid elements are usually present and distinct.

Acromiotrachelien in the Hare‖ is inserted with the humeral fibres of the trapezius, and in Agouti¶ in addition partly into the aponeurosis of the arm.**

Amongst the *Carnivora* the rhomboid sheet may have the three factors represented as a single sheet (*Procyon*), or they may be distinct.

In the Dog and others the occipital portion seems to be absent.††

The acromiotrachelien is often inserted with the trapezius, and frequently passes backwards crossed by the cephalo-humeral muscle, to be inserted into the acromion close to or beneath the acromial part of the trapezius.†† It is double in *Cercoleptes*.§§

M. sternomastoideus (figs 2, 3, and 5 *s.m.*) takes origin from the anterior projection of the presternal rostrum, and forms a rounded or prismatic fleshy mass inserted into the mastoid region of the skull just above the external auditory meatus and under cover of the parotid gland.

The fibrous continuation of the imperfect clavicle passes inwards to the presternal rostrum just dorsad of the origin of the muscle. The muscles of opposite sides are in partial contact close to their origins.

No cleido-mastoid element is present, though such is present in all other marsupials; and, as already mentioned,‖‖ the cleido-occipital, common to all other marsupials, is likewise absent unless the fibres I have named *cleido-trapezius* are to be regarded as such.

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* xi., page 212. † vi. Pl., 75, fig. 1, and Pl., 77, fig. 2. ‡ xl., page 393. § xxvi., page 728. ‖ vi., Pl., 232. ¶ vi., Pl., 245. ** Cf., also vi. Pl., 240 and 249. †† ix., page 180. ‡‡ vi. Pl., page 109. §§ l., page 547. ‖‖ Supra.

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In *Ornithorhynchus* the sterno-mastoid is double, one portion being placed beneath the other.* Neither cleido-mastoid nor cleido-occipital are segmented off from the sterno-mastoid-trapezius system in either of the monotreme forms.† In *Echidna* the sterno-mastoid has an extensive origin from the ventral face of the median bar of the interclavicle, the presternum, and a large part of the meso-sternum. Its origin covers part of the origin of the pectoralis major. The origin, as I have found it, is thus more extensive than Mivart describes it; nor did I find it so narrow as he did.

A cleido-mastoid is present in *Chlamydophorus*,‡ *Tatusia*,‡ *Dasypus*,§ *Orycteropus*,‖ and amongst other *Edentata*, though it is not invariably present, while the cleido-occipital is frequently absent in this order, though present in *Chlamydophorus* and some others.¶

Both sterno- and cleido-mastoids are usually present in *Rodentia Insectivora* and *Carnivora*, though the segmentation of the cleido-mastoid from the sterno-mastoid is frequently incomplete. A cleido-occipital, too, is generally developed, but its relations are often modified by the partial or complete suppression of the clavicle, when it may enter, with the clavicular deltoid, into the formation of a cephalo-humeral muscle. It is very frequently, wholly or partially, fused with the cleido-mastoid, or in some forms with trapezius.

I cannot find any instance in these orders of entire absence of both cleido-mastoid and cleido-occipital.

M. deltoideus (figs. 1-5, *d.t.*, *c.d.t.*, *c.d.*, and *s.d.*) consists of two distinct sectors, in addition to the delto-trapezius already described (trapezio-deltoid). The latter occupies a position intermediate between the other two in its course distally towards the humerus, and in its course it crosses and covers the insertion of the subclavius into the mesial border of the "meso-scapular segment."

The clavicular portion of the deltoid (*M. cleido-deltoideus*), figs. 3 and 7, *c.d.*) is comparatively small, and arises from the outer or lateral third of the clavicle, and thus corresponds to the insertion of the cleido-trapezius. It covers part of the subclavius muscle.

The scapular portion of the deltoid (*spino-* or *acromio-deltoid* figs. 1-5, *s.d.*) takes origin from the outer or lateral borders of the acromion and meso-scapular segment, and from the entire length of the post-axial lip of the true scapular spine (meso-scapula), the posterior fibres lying in the sulcus between the scapular spine and the broad scapular head of the triceps muscle (fig. 2, *tr.*). This part of the muscle is crossed by the ribbon-like spino-trapezius.

All three sectors of the muscle (including the delto-trapezius) are inserted into the proximal tubercle and mesial border of the elongated delto-pectoral tuberosity of the humeral shaft.

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* xlv., page 5. † xxxix., page 381. ‡‡ xxvii., page 232. § xiv., page 527. ‖ xv., page 571. ¶ xxvii., page 232.

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This arrangement of the fibres of the deltoid series closely resembles that figured by Cuvier & Laurillard in *Phalangista*,* and described in *P. vulpina* by MacCormick.† It is thus of the bipartite variety, the scapular deltoid not being segmented into acromial and spinous portions.

The muscle is unsegmented in the Giant Kangaroo (Macalister and Cuvier & Laurillard) *Macropus minor* (C. & L.), *Macropus Bennettii*, and *Didelphys* (Macalister).‡ It is bipartite in Cuscus and *Thylacinus*,§ as well as in the Vulpine Phalanger, as already mentioned; also in the Wombat,‖ and in Koala according to Young,¶ though according to Macalister** it consists of "three parts inseparably united" in the latter animal.

It is tripartite in *Phascogale*,†† and in *Dasyurus viverrinus*.‡‡ In *Sarcophilus*§§ the spinous and acromial portions of the scapular deltoid are separate, but there is "no clavicular deltoid separate from the outer fibres of the acromial portion."

In *Perameles* an accessory slip from the inferior costa of the scapula is present according to Owen.‖‖

The deltoid in *Ornithorhynchus*¶¶ is generally regarded as single and scapular, though Owen*** follows Meckel††† in regarding as an anterior part of the deltoid that deep ventral muscle which Mivart‡‡‡ has named "epicoracohumeral" in *Echidna*. Cuvier and Laurillard figure the latter muscle§§§ as a middle or lesser pectoral.

In *Echidna*, Mivart‖‖‖ describes and figures a double deltoid; one portion is scapular, and corresponds to that in *Ornithorhynchus*, while the other is claviculo-acromial, and corresponds in position and attachments to a muscular sector, which seems to constitute the most anterior division of the pectoralis major in *Ornithorhynchus*.

Westling,¶¶¶ in remarking upon this correspondence, raises the question for future decision whether in *Ornithorhynchus* we have a fusion of originally distinct muscles, or whether the condition in this animal is primary, the anterior part of the deltoid in *Echidna* having arisen as a secondary differentiation from the pectoralis major.

Westling states that the two muscles are certainly homologous, corresponding in origin, position, and innervation. Working in this laboratory, my friend and former pupil, Dr. W. J. McKay, has satisfied himself of this homology, and is strongly inclined to the belief that the sector in question in *Ornithorhynchus* in reality belongs to the deltoid system, and not to the pectoral. He finds that it corresponds accurately in postion and attachments to the "anterior deltoid" in *Echidna*, and as in the latter animal it splits at its insertion to enclose, or rather it is folded round, the tendinous insertion of the posterior deltoid. Again, he confirms Westling's statement in reference to the innervation of the muscle. As in *Echidna*, so in *Ornithorhynchus*, it is supplied exclusively by the "nervus axillaris," which also supplies the posterior deltoid in both animals. The anterior thoracic nerves which

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* vi. Pl., 177, fig. 2, and Pl., 179, fig. 1. † xxxvi., page 115. ‡ xxix., page 159. § iv. ‖ xxix., page 159. ¶ lxxii., page 226. ** xxviii., page 130. †† iv., page 9. ‡‡ xxxvi., page 115. §§ xxix., 159. ‖‖ xlv., page 11. ¶¶ xxvi., page 791, and vi. Pl., 265, fig. 2. *** xlv., page 6. ††† xxxvii., page 26. ‡‡‡ xxxix., page 384. §§§ vi. Pl., 266, fig. 2. ‖‖‖ xxxix., page 384, Pl. 52, fig. 2. ¶¶¶ lxii., page 17.

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supply the true pectoralis fibres send no filaments to this muscular mass, and the only other nerve in relation to it is a cutaneous branch of the N. supra-coracoideus (peculiar to Monotremes) which pierces the muscle, but, *contra* Westling, *without* supplying twigs to it.

In *Chlamydophorus** the deltoid is tripartite, with clavicular, acromial, and spinous sectors, as is the rule amongst the *Edentata*. The clavicular deltoid may, however, be absent, as in *Bradypus*,† or it may be rather small, as in *Chlamydophorus*. In *Bradypus* the acromial and spinous portions are fused.

In the Paca‡ a clavicular deltoid is separated from an imperfectly divided acromio-spinous sector by a prolongation of the acromio-trachelien. A similar clavicular muscle-segment with imperfectly separated acromial and spinous portions was found by Mivart and Murie in Agouti and other rodents,§ but they consider the clavicular fibres to form part of the pectoralis major.

In the Hedgehog‖ the deltoid is distinctly tripartite, the acromial and spinous portions being separated by the insertion of the acromio-trachelien. Leche,¶ however, refers to it as single.

In *Talpa* the scapular (spinous) portion is absent, according to Meckel** and Freeman.††

In *Gymnura*‡‡ the clavicular portion is absent.

In *Chrysochloris* the muscle arises from clavicle and metacromion.

In the Cat, and apparently in the *Carnivora* generally, the clavicular deltoid is practically continuous with the cleido-trapezius forming the cephalohumeral muscle. Acromio- and spino-deltoids are also present, so that the muscle is here generally tripartite.

M. *latissimus dorsi* (figs. 1, 2, 6, and 7) resembles in general shape the muscle in the human subject. It is crossed by the spino-trapezius.

Its origin is from the dorsal spines from the 3rd to the 12th (inclusive). There are no costal origins. Its fibres converge laterally and anteriorly towards the axilla, where, at the hinder border of the massive triceps, they ultimately form a thick prismatic fleshy mass partly overlapped by the latter muscle. The latissimus is entirely destitue of a humeral insertion. Lying just posterior to the triceps, it enters the forearm, halfway down which the fleshy fibres end abruptly in the aponeurosis of the forearm, which is thus greatly strengthened, forming a dense layer on the surface of the flexor carpi ulnaris. The aponeurosis may be traced down to the manus. The insertion thus corresponds to one form of a dorso-epitrochlearis insertion, which is not otherwise present, and probably we ought to regard the two muscles as fused, or rather as unsegmented from one another. No trace of such a fusion in the form of a tendinous intersection was present. The muscle is quite unconnected with the teres major, but opposite the olecranon its fibres run just parallel to

* xxvii., page 243. † xxxii., page 56. ‡ vi. Pl., 249, fig. 2, and Pl., 251, fig. 1. § xl., page 398. ‖ vi. Pl., 75 and 76. ¶ xxvi., page 792. ** xxxviii., page 496. †† xi., page 213. ‡‡ xxvi., page 792.

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the scapular head of the triceps, and it seems partially adherent to the postaxial border of that muscle.

In no other marsupial whose myology is recorded is the humeral insertion lacking, and in all there is a distinct dorso-epitrochlearis present.

The extent of the vertebral attachment varies much amongst marsupials, and a costal origin is absent in many *e.g.*, *Didelphys*,* *Dasyurus*,† and Koala,‡ &c.; while in Wombat§ it arises from no less than six of the lower ribs. In the three forms described by Cunningham‖ only the last rib afforded an attachment to the muscle.

In *Echidna* Mivart¶ describes and figures two muscles as representing the latissimus. The posterior of these is interesting, as its insertion corresponds with that in *Notoryctes*. It is "very elongated, and is triangular from its origin as far as the elbow. It arises, by digitations, from six ribs (namely from the 8th to the 13th), and, becoming narrower, passes beneath the interior condyle. A little below the middle of the forearm it becomes intimately united with the surface of the flexor carpi ulnaris." The ulnar insertion of the panniculus is figured as in close dorsal relation to the latter. The anterior muscle from the first eleven dorsal spines is "inserted into the inner condyle of the humerus, in union with what appears to be the dorso-epitrochlear." This "dorso-epitrochlear" the author describes as arising from the posterior extremity of the vertebral border of the scapula and from the tendon of the teres major, and as inserted into the inner condyle of the humerus with the second part of the latissimus by a very strong tendon. The term "dorso-epitrochlear" as applied to this slip cannot be retained, as the fibres in question are undoubtedly only a deep slip of the latissimus. The true dorso-epitrochlear fibres are to be sought for amongst the fibres of insertion of the posterior part of the latissimus. Westling indeed reckons the latter muscle as simply a dorso-epitrochlearis (including "dorso-antebrachialis" and "dorso-brachialis" portions).**

In *Ornithorhynchus*, Owen,†† following Meckel, describes the latissimus as long and broad, arising from all the dorsal and lumbar spines and the eleven posterior ribs, and inserted by a broad and strong tendon into the distal half of the ulnar margin of the humerus, and, with part of the panniculus, into the fascia attached to the olecranon and spreading over the forearm. At its anterior part the muscle may be divided into a superficial and a deep stratum. Here, as in *Echidna*, the dorso-epitrochlear fibres are probably represented by those which descend into the forearm and spread out in its fascia.

In Cuvier & Laurillard's plates,‡‡ however, a segmentation is figured into an anterior or spinal and a posterior or costal portion, answering to Mivart's similar segments in *Echidna*.

In *Chlamydophorus*§§ the muscle also consists of two parts, but the anterior, which arises from hinder dorsal and anterior lumbar vertebræ, is inserted into the "posterior inferior angle of the post-scapula." This is unrepresented in any other *Edentata*. The second (posterior)

* xxix., page 156. † xxxvi., page 105. ‡ xxviii., page 129. § xxix., page 156. ‖ iv., page 5. ¶ xxxix, page 380. ** lxii., page 21. †† xlv., page 11. ‡‡ vi. Pl., 266, *i.* and *i. 1.* §§ xxvii., page 236.

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part of the muscle is costofascial in origin, is closely attached to the pectoralis quartus, and has the usual humeral insertion close to the teres major. Other *Edentata* vary as regards origin of the muscle, but all possess the usual humeral insertion, while, in addition, they all possess a dorso-epitrochlearis element associated with the latissimus, and often closely connected with the panniculus or pectoralis quartus. The insertion of the dorso-epitrochlear muscle is more variable than in marsupials, and is frequently prolonged into the fascia of the forearm (*Chlamydophorus** and *Orycteropus*†), or even to the palmar fascia (*Cyclothurus*‡), and it may be partly united with the scapular triceps, as in *Orycteropus*.§

In *Talpa* Cuvier & Laurillard‖ figure the latissimus as giving off a slip to the fascia of the forearm before becoming inserted into the humerus. This is not mentioned by Freeman,¶ but is plainly a true dorso-epitrochlear slip.

In this animal, as noted by the latter observer, the latissimus is rather large, and consists of two portions, anterior and posterior, separated by an interspace. The two parts, however, unite, and are humeral in their insertion.

A dorso-epitrochlearis is present in all the *Insectivora*. It is broad and thin in *Gymnura*.** In *Chrysochloris*†† it consists of fibres, which pass from the latissimus to the ossified tendon of the flexor profundus digitorum. The latissimus itself in this animal is inserted into a process running out from the internal condyle of the humerus.

The dorso-epitrochlearis is usually present in *Rodentia* and *Carnivora*. In the Rabbit‡‡ it is continued into the flexor carpi ulnaris according to Humphry.

M. serratus magnus (figs. 6, 7, and 21, *s.mg.*) consists of two portions—anterior and posterior.

The anterior, by far the larger, is a fan-shaped muscle, partly cervical, but chiefly costal in its origin.

The costal fibres arise as a series of fleshy slips from the first five costal arches, the more posterior origins being partly overlapped by the lateral free margin of the M. rectus abdominis. The origin from the first costal arch is from the vertebral segment, and partly indeed from its tubercle dorsally. The cervical fibres form only a small anterior portion of the muscle lying dorsal to the cords of the brachial plexus, and arising from the transverse process of the seventh cervical vertebra, and slightly from the corresponding portion of the fused cervical vertebral mass.

This anterior portion of the muscle is inserted along the whole length of the ventral lip of the vertebral border of the scapula close to the rhomboid insertion.

The posterior sector of the muscle (not shown in drawing) is separated from the anterior at its origin by a very considerable

* xxvii., page 236. † xv., page 574. ‡ xxvii., page 237. § xv., page 574. ‖ vi. Pl., 80, fig. 5. ¶ xi., page 212. ** viii., page 395. †† xxv., page 807. ‡‡ xx., page 151.

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interval. It is a slender slip, placed under cover of the latissimus dorsi, which arises from the eighth, ninth, and tenth ribs, a short distance external to the line of their angles (and distinctly from the dorsal aspect of the chest wall). This runs forwards under cover of the latissimus to reach the hinder angle of the vertebral border of the scapula. There it crosses the posterior part of the insertion of the rhomboid, and is inserted into the dorsal aspect of this angle of the bone. At its insertion its fibres are close to and parallel with the scapular attachment of the anterior sector of the muscle with whose fibres it was evidently in series, constituting a *retractor scapulæ* muscle. Its nerve supply was from the nerve to the serratus.

There is no separate levator anguli scapulæ muscle present, the serratus as described representing the entire "*trachelo-costo-scapulur*" muscle of Testut.*

Amongst marsupials the levator scapulae is nearly always lacking as a separate muscle, and the serratus is invariably trachelo-coste-scapular in its attachments, and is generally a continuous sheet. The extent both of its costal and its cervico-vertebral attachment is very variable. It is a single and continuous sheet in Koala,† *Thylacinus*, and *Phascogale*,‡ *Dasyurus* and *Phalangista*,§ *Macropus gig.* and *minor*.‖ Macalister found it in Wombat‖ divided into a weak upper part from four cervical vertebræ and three upper ribs, and a strong lower part from the ribs from the fifth to the eleventh, converging to the subscapular aspect of the inferior angle of the scapula, and a small part of the axillary margin. The condition was the same in one specimen of *Sarcophilus*,‖ but in another¶ he found a separable levator anguli scap. from the second and third cervical transverse processes.

In *Didelphys*** a levator anguli scapulae is wholly or partly separable. Cunningham†† found "an indication of a division of the serratus in *Cuscus* into a cervical and a costal portion."

In *Dasyurus*,‡‡ although the muscle is continuous, MacCormick describes the posterior five costal digitations as converging "in a fan-like manner, so as to come to a point at the posterior superior angle of the scapula, where they are inserted tendinously. The posterior edge of the tendon folds round the posterior part of the insertion of the rhomboid." This latter part of the muscle, as well as the detached posterior sector in Wombat,§§ I take to be homologous to the detached posterior slip in *Notoryctes*, although the latter is more dorsally placed, and altogether beneath the latissimus; *c.f.*, also Cuvier & Laurillard's plate of *Phal. cavifrons*.‖‖

In *Echidna*¶¶ the serratus magnus and levator anguli scap. are inseparable, forming a thick layer, extending back as far as the fourth rib only, or the fifth rib according to Westling.***

Meckel††† describes the serratus magnus in *Ornithorhynchus* as con-

* lvi., page 66. † xxviii., page 129, and lxxii. ‡ iv., page 6. § xxxvi., page 110. ‖ xxix., page 155. ¶ xxx., page 18. ** xxxviii., page 478, and vi. Pl., 175, fig. 3. †† iv., page 5. ‡‡ xxxvi., page 110. §§ xxix., page 155. ‖‖ vi. Pl., page 178. ¶¶ xxxix., page 383. *** lxii., page 13. ††† xxxviii., page 487, and xxxvii.

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sisting of two distinct portions—a posterior costal from the first three ribs, and an anterior part from the six lowest cervical vertebræ. The fibres of the former converge to the inferior angle of the scapula, and those of the latter to the vertebral margin. In addition he describes* two levatores anguli scapulae, one or both of which, however, are more probably to be looked upon as of the nature of "acromio-trachelien" muscles.

In *Chlamydophorus*† the serratus magnus is large, single and undivided, the levator anguli scapulae being unsegmented from it. In *Tatusia* and *Dasypus*, Macalister‡ found it bipartite, the anterior costo-cervical part including levator anguli.

Humphry§ recognises in the Aï both anterior and posterior serratus factors and levator anguli, and Macalister‖ found the same in *Cyclothurus*.

In *Orycteropus* and several other Edentates¶ the "*trachelo-costo-scapular*" system of fibres is either continuous or imperfectly divided.

In Agouti and various other Rodents** (Guinea Pig, Rabbit, and Hare) conditions obtain similar to those just described, *i.e.*, there is a "trachelo costo scapular" muscle corresponding to the serratus magnus and levator scapulæ. In Agouti it is indivisible; in the other forms there is a line of separation in the muscular sheet opposite the third rib, which Mivart and Murie regard as marking off the levator. In the Rabbit Leche†† follows Krause in regarding as the true levator anguli a distinct muscle which others‡‡ regard as a rhomboideus capitis.

In *Talpa*§§ the serratus and levator scapulæ are distinct, and the former purely costal in origin. So also in *Erinaceus* and *Chrysochloris*‖‖, though in the latter the anterior border of serratus is overlapped by the levator. In *Gymnura*, however, according to Dobson¶¶, the serratus magnus is "very large, consisting of a cervical and a thoracic portion, the former the united levator anguli scapulæ."

In most *Carnivora* the trachelo-costo-scapular muscle is a continuous sheet.

M. subclavius (fig. 3, *s*, and figs. 6 and 7, *s.c.*) takes origin from the anterior border and part of the ventral surface of the first costal arch, being attached to, and around, the prominent tubercle on the anterior border of the rib. At this point the costal arch exhibits in some specimens a segmentation into vertebral and sternal portions, in the shape of a synchondrosis whose plane cuts the tubercle obliquely. The muscle thus arises from adjacent portions of *both* sternal and vertebral rib-segments.

This subdivision is not visible in all specimens.

The muscle thus arising is comparatively narrow at its origin, but spreads out into a broad and slightly tendinous band as it proceeds forwards and outwards to its insertion, which is into the mesial border of the "mesoscapular segment" of the shoulder-girdle, partly into the adjacent part of the mesial border of the

* xxxviii., page 478. † xxvii., page 242. ‡ xxvii., page 242. § xxii., page 32. ‖ xxvii., 242. ¶ xv., page 570, and xxvii., page 243. ** xl., page 393. †† xxvi., page 730. ‡‡ lvi. and xl., page 393. §§ xi., page 212. ‖‖ xxvi., page 767. ¶¶ viii., page 394.

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acromion, and slightly in front of this into to the fascia over the supraspinatus muscle. In its course it passes under cover of the clavicle, and of the cleido- and deltotrapezius. At its origin it lies immediately mesiad of the insertion, into the ventral face of the first costal arch, of the M. rectus abdominis, and immediately dorsal to it the great vessels of the forelimb arch over the first rib to enter the axilla. They are, however, sunk in the deep concavity behind the tubercle of origin of the muscle. Under cover of the tendon of insertion there stretches a strong ligamentous arcuate band between the coracoid and the mesoscapular end of the clavicle—a *coraco-clavicular* ligament. As the muscle passes under cover of the clavicle and cleido-trapezius the post-axial border of the subclavius is more or less adherent to the deep surface of these structures, and a deep lamina of the tendon of insertion is attached or adherent to the coraco-clavicular ligament.

The origin of this muscle amongst marsupials is a very constant one. It arises from the first costal cartilage as in man, or from the first rib. In *Notoryctes* no fibres from any other source of origin enter the subclavius such as Rolleston has described arising from the sixth costal cartilage in Wombat.*

The insertion, on the other hand, is very variable in this order. The fibres are wholly arrested at the clavicle as in man in Cuscus, *Phascogale*,† *Macropus major* and *minor*, *Phalangista cavifrons*,‡ and Koala (usually).§

In *Thylacinus*|| it is attached solely to the fascia over the supraspinatus muscle, constituting a variety of sterno-scapular muscle.

In *Sarcophilus*¶ Macalister found it attached to the clavicle only in one case, and to clavicle and scapular spine in another, and to clavicle and acromion in *Didelphys*;** while in *Dasyurus viverrinus* and *Phal. vulpina*†† it is inserted into clavicle, acromion, and supra-spinatus fascia, and in Wombat, by means of the latter to the whole length of the scapular spine (Rolleston).‡‡

In *Echidna* and *Ornithorhynchus*, according to Rolleston,§§ the subclavius muscle is represented by the epicoraco-humeral muscle of Mivart.|||| This arises in *Echidna* from the ventral surface and outer border of the epicoracoid, and is inserted into the radial tuberosity of the humerus between the pectoral and supra-spinatus insertions and into a ridge running distally from this.

The muscle in *Ornithorhynchus* corresponding to Mivart's epicoraco-humeral has beeu figured by Meckel, as already noted,¶¶ under the name of an anterior deltoid, and by Cuvier and Laurillard*** as a middle or small pectoral.

Humphry, as against Rolleston, takes the latter view of this muscle in Monotremes, when he says,††† "I conceive the pectoralis minor to

* li., page 626. † iv., page 6. ‡ vi. Pl., 195, 181, and 179. § lxxii., page 226, and xxviii., page 130. || iv., page 6. ¶ xxix., page 158, and xxx., page 130. ** xxix., page 158. †† xxxvi., page 111. ‡‡ li., Explan. of fig. 3 and Pl. 47. §§ li., page 617. |||| xxxix., page 383. ¶¶ Supra p. *** vi. Pl., 266, fig. 2. ††† xx., page 157.

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be formed from factors of the pectoralis major which, or some of which, represent the epicoraco-humeral of Urodelans, Reptiles, and Monotremes." And Mivart himself regards the subclavius as represented in *Echidna* by "a small and thin muscle which arises from the anterior border of the first rib for the greater part of its length, and which is inserted into the coracoid immediately behind (or rather above) the origin of the coracobrachialis."*

This "costo-coracoid" muscle in *Echidna* is described and figured by Westling.†

I am indebted to Dr. McKay for most of the following particulars regarding the corresponding conditions in *Ornithorhynchus*.‡ A fairly-strong costo-coracoid muscle is present, with similar attachments to those in *Echidna* given above, from Mivart. Its fibres converge to a tendinous insertion into the posterior tip of the coracoid. This muscle must, I imagine, correspond to the "pectoralis minor" referred to by Owen§ as "inserted into the coracoid," or less probably to his "subclavius," which he describes as "also inserted into the coracoid." While, then, the costo-coracoid muscle of *Ornithorhynchus* is either Owen's lesser pectoral or his subclavius, the other of these must find its homologue in a muscle called by Westling in *Echidna* "sterno-coracoid,‖ but which neither in that animal nor in the *Ornithorhynchus* is attached to the coracoid, though it is in close relation to that bone. Thus in *Ornithorhynchus* it arises from the anterior border of the first costal arch just mesiad of, and close to, the costo-coracoideus; and it also arises from the dorsal, or deep, aspects of both the interclavicle (slightly) and the presternum. It is inserted into the anterior half of the dorsal or deep surface of the epicoracoid in close relation to (mesiad of) the origin of the "epicoraco-brachialis." A somewhat more appropriate, if more cumbrous, name for this muscle is *M. sterno-costo-epicoracoideus*.

Both of these muscles (*Mm. costo-coracoideus* and *sterno-epicoracoideus*) I take to represent the ordinary mammalian subclavius, for not only are the two muscles in such close relation, possessing analogous attachments, but their innervation is from a common source, viz., a branch of the brachial plexus (ventral aspect) homologous to the *nervus thoracicus inferior* of Fürbinger in Saurians,¶ and probably to the "nerve to the subclavius" of mammals.

In *Echidna* Dr. McKay finds this nerve giving a branch to the phrenic, as the nerve to the subclavius occasionally does in man.

Their segmentation as distinct muscles is doubtless correlated with the partially independent mobility of coracoid and epicoracoid.

The marked divergence of type from the ordinary mammalian subclavius is dependent upon the high development of the coracoids, causing interruption of the fibres, and thus arresting them in their passage towards clavicle and scapula.

In *Chlamydophorus*** the subclavius is large, and has a wide origin from the broad sternal segment of the first costal arch. It passes beneath clavicle, and is inserted into the coracoid process, the acromion and the acromial end of the clavicle very slightly or not at all (Hyrtl).††

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*xxxix., page 382. †lxii., page 14, and Taf. ii., fig. 6 *c.c.* ‡lxxvii. §xlv., page 6. ‖lxii., page 15, and Taf. ii., fig. 6 *st. c.* ¶xiii., page 709-11. **xxvii., page 241. ††xxiv., page 32.

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Macalister also describes separately a retro-clavicularis included by Hyrtl as part of the subclavius, and passing from first rib to acromion and supraspinous fascia.

In *Orycteropus** Galton found the subclavius arising from the manubrium sterni and its junction with the first rib, and also by fibres prolonged from the terminal aponeurosis of the rectus abdominis. Humphry† in the same animal found it arising from first and second costal cartilages and adjacent part of sternum, while both authors fonnd it inserted into acromial part of clavicle, acromion, and fascia over the supraspinatus muscle; while in addition Galton found it inserted into a sesamoid bone just below the acromio-clavicular joint, embedded in fibres of the deltoid, and which he surmises may possibly be a "meso-scapular segment." He also says that a thin stratum derived from the lower portion of the muscle finds insertion by aponeurosis along the inner edge of the strong coraco-acromial ligament.

According to Humphry‡ and Macalister the muscle is entirely absent in *Manis* and the Anteaters and Armadilloes. In Aï it was thin and weak. In *Tatusia*§ Macalister found it very large.

In *Dasypus sexcinctus*, according to Galton|| and Macalister,¶ the muscle is strongly developed. And in Cuvier & Laurillard's plate, No. 260, the muscle is seen closely to resemble that in *Notoryctes*. Galton describes it as arising from the "irregularly oval and roughish depression seen at the expanded anterior termination of the first rib, and also from its superior edge for a short distance." "It is inserted by a flat tendon along the whole extent of the upper ridge of the long acromion process of the scapula, and becomes, moreover, continuous with the strong fascia which covers the head of the humerus and which is lost over the supra-spinatus. The strong coraco-clavicular ligament passes across through the substance of the muscle, close to the insertion of the latter, splitting it into two unequal portions, the smaller and anterior of which dips under the ligament to join its tendon, while the largest portion passes over the ligament." This insertion (see also Galton's fig. 2, pl. 44) much resembles that in *Notoryctes*.

In *Dasyprocta cristata* Mivart and Murie** describe a "sterno-scapular" muscle with double origin, the smaller factor of which they suggest (following Meckel††) may be subclavius. (Galton‡‡ refers to this observation in connection with the subclavius in *Dasypus*.) The whole muscle is long and narrow, and the smaller head arises from the outer side of the base of the manubrium and from the cartilage of the first rib. The larger head arises from the sternum between the origins of the first and second parts of the pectoralis major. The muscle is inserted slightly into the distal end of the clavicle and into the scapula and fascia over the supra-spinatus.

In the Rabbit and Guinea Pig, according to the same authors,§§ the two slips are present, but in the Hare there is only one broad origin. In the Porcupine also, according to Galton,|||| the muscle is a single strap-like band arising from the costal portion of the first rib, and

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* xv., page 571. † xxi., page 297, and xxxv., page, 494. ‡ xxii., page 26. § xxvii., page 241. || xiv,, page 528. ¶ xxvii., page 241. ** xl., page 398. †† xxxviii., page 444. ‡‡ xiv., page 528. §§ xl., page 398. |||| xiv., page 529, and vi. Pl., 229, fig. 2.

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inserted partly into the scapular end of the clavicle and into the spine of the scapula and the fascia over the supraspinatus muscle. (*C.f.* also Rolleston's detailed description of the double sterno-scapular muscle in the Guinea Pig, the smaller of which he also regards as homologous to the subclavius.*)

Windle just mentions† the subclavius as "a strong muscle" in *Erethizon epixanthus*, but the same author‡ has described in detail the condition in the Rabbit, and concludes that the deep sterno-scapular slip there present represents probably part at least of the subclavius.

In *Talpa* Freeman§ refers to the large subclavius arising from prosternum and first rib, and dividing into two parts to be inserted (*a*) into the outer third of the dorsal margin of the coraco-clavicle (*b*) into the short acromion and the acromio-clavicular ligament.

Cuvier and Laurillard|| figure a subclavius in the Hedgehog whose origin very closely resembles in its relations that of *Notoryctes;* its insertion¶ appears to be clavicular and acromial.

Leche** notes a subclavius as present in *Condylura*, *Solenodon* and *Gymnura*.

A true subclavius seems hardly to be represented amongst the *Carnivora*, though sterno-scapular slips are found, *e.g.* in Dog and Hyæna**, and in *Procyon cancrivorus*†† and others. Probably most of these slips are of the nature not of subclavius, but of "pectoralis minimus," or, as Windle names them, "deep manubrial" slips of the pectoral group (see this author's discussion on the subject of sterno-scapular slips).‡‡

M. pectoralis (figs. 3, 6 and 7, *p.a.*, *p.b.*, and *p.c.*). The pectoralis system of fibres consists of a large mass of considerable thickness and of the ordinary triangular or fan-like shape. It is separable into three sectors, which we have distinguished as A, B and C, with which will also be described the humeral portion of the panniculus carnosus.

In one specimen the sternal rostrum was specially large, and was perforated by a large oval fenestra (fig. 21, *fen.*) filled up with fibrous membrane from either side of which fibres of opposite pectoral muscles took origin.

M. pectoralis A (figs. 3, 6 and 7, *p.a.*) arises from the rostrum and body of the presternum and from the sternal end of the clavicular arch, the latter fibres being overlapped at their origin by the sternal attachment of the sterno-mastoid muscle. Its deepest fibres further arise from the broad, flat and expanded inner end of the first costal arch. From this origin the fibres extend outwards, chiefly transversely, but the hinder fibres more obliquely, towards the humerus, and they end in a partly fleshy insertion which is attached, along with that of the next sector, into the distal of the two tuberous elevations of the "deltoid ridge," which is thus a *deltopectoral tuberosity*.

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* li., page 611-2. † lxv., page 128. ‡ lxvii., page 354. § xi., page 211. || vi. Pl.. 75, fig. 2 *h*. ¶ vi. Pl., 76, fig. 2. ** xxvi., page 764. †† lxvi., page 82. ‡‡ lxvii., page 352, *et seq.*

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M. pectoralis B (figs. 3, 6 and 7, *p.b.*)—the second sector of the pectoral mass—is separated from the more anterior, A, by an almost transverse cleavage line, but its fibres are otherwise simply in series with the fibres of A. It arises from the whole length of the mesosternum, and also by deep digitations from the adjacent parts of the sternal segments of the second to the sixth costal arches, inclusive. Its fibres pass obliquely outwards and forwards, converging to a thin flattened tendon which becomes continuous at the humeral end with the more fleshy insertion of pectoralis, A, which it partly overlaps.

M. pectoralis, C (figs. 3, 6 and 7, *p.c.*), is separated from the rest of the muscle superficially by a sulcus of radial cleavage, but its insertion is totally different from that of the two preceding sectors. It is the most posterior and lateral of the three pectoral muscles, and on the whole its origin is deeper, and is largely covered by the muscle last described.

It arises by a series of deep fleshy slips from the sternal segments of the second to the seventh costal arches (inclusive), laterad of, and overlapped by, the corresponding slips of pectoralis B, from which it is completely separate.

Its outer or axillary margin is not covered by B until it enters the axilla; it is, however, covered posteriorly (caudad) by the mesio-ventral portion of the superficial muscular sheet of the panniculus. The latter is here very thin, and consists of fibres arising from the anterior abdominal aponeurosis near the mesial line, and extending forwards and outwards. These fibres do not form a distinct band, but they probably represent the pectoralis quartus, which is otherwise absent.

Immediately external to the lateral border of pectoralis C the pannicular fibres form a denser layer, covering a portion of the rectus abdominus, which courses forwards beneath them and parallel with pectoralis C. The fibres of the humeral portion of the panniculus stratum cover the whole lateral thoracic wall in a continuous sheet, extending from the surface of pectoralis C laterally and dorsally as far as the ventral border of the latissimus. Its fibres are directed forwards, converging to enter the axilla, and are then inserted into the border of a tendinous arch, which crosses the axillary vessels and nerves. The ventral end of this tendinous arch is attached to, and inserted along with, the insertion of pectoralis C into the greater (radial) tuberosity of the humerus close to the joint-capsule, and just external to, and also bridging over, the bicipital groove, and thus indirectly into the lesser tuberosity of the humerus.

It appears to me very evident that the sectors denominated A and B together represent the "pectoralis major;" and that sector C represents the "pectoralis minor." Further, a pectoralis quartus is not

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differentiated from the "humeral" or "abdomino-humeral" panniculus.

Adopting Windle's* convenient classification of the pectoral group of fibres, I may say that pectoralis A is a "superficial manubrial," or rather "manubrio-clavicular;" pectoralis B is a "gladiolar," fused with a superficial lamella of a "costal" segment; that pectoralis C is a deep "costal" segment; and that an "abdominal" segment is represented by the abdomino-humeral panniculus, no special pectoralis quartus being present distinct from the latter. Upon the question of the morphological relations of the pectoral muscles to the panniculus, *c.f.*, also paper by Parsons upon the myology of rodents;† this author regards the pectoral mass as differentiated from the panniculus.

With regard to the attachment of the humeral panniculus it may be noted that the dorsal end of the tendinous arch described above possesses no definite attachment to bone. It is traceable dorsally under cover of the latissimus, which there overlaps the humeral panniculus as the latter enters the axilla. It is doubtless the homologue of the achselbogen so commonly present in mammals, such as, for example, MacCormick‡ notes in *Phalangista*, which there, as in *Notoryctes*, receives fibres of the panniculus, and in *Phalangista* also fibres of the pectoralis quartus. If we are to look upon part of the panniculus fibres in *Notoryctes* as those of a pectoralis quartus, then the fibres of the latter muscle are not inserted along with or close to those of the pectoralis major as in Cuscus, *Thylacinus*, and *Phascogale*,§ and in *Phalangista vulpina*,‖ but, like the fibres of MacCormick's "ventro-humeral" muscle (true pectoralis quartus?), are blended with the tendon of the pectoralis minor.

The question of the homology of the pectoralis quartus has been the subject of much discussion by many writers, and it is certain that various pectoral and axillary muscles have indifferently received this name. Windle concludes his discussion of the subject by remarking that "the diverse views held by authors who have been cited, and by others who might have been mentioned, with regard to pectoralis quartus and achselbogen, are many of them reduced to an agreement, by what I believe to be a right comprehension of the so-called panniculus of the abdomen, namely, that it is the hindermost portion of the members of the pectoral group." I cannot think that this is a satisfactory mode of statement, and I should incline rather to accept Prof. Cunningham's¶ view in reference to axillary muscles generally, that in that region "there is not the same sharp, well-defined subdivision between the panniculus and the deeper stratum that exists elsewhere."

For a general survey of the arrangement of the elements of the pectoral group of muscles in various mammalian orders I would simply refer to Windle's comprehensive sketch in the memoir already quoted from.**

M. subscapularis (figs. 6 and 7, *sbs.*). A comparatively broad and triangular muscle, whose fibres are arranged in a bipenniform manner. Its fibres arise from the venter or inner aspect of the

* lxvii., page 349. † xlviii., page x *et seq.* ‡ xxxvi., page 112. § xxi., page 7. ‖ xxxvi., page 112. ¶ v., page 385. ** lxvii.

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scapula in its whole extent, and from the septum between it and the adjacent teres major, and they are inserted into the lesser *(postaxial)* tuberosity of the proximal end of the humerus.

The muscle not only covers the mesial aspect of the comparatively narrow scapula, but projects both anteriorly and posteriorly beyond the limits of the bone so as to lie in contact with the supra-spinatus preaxially and with the broad scapular head of the triceps postaxially (the latter muscle being attached to the whole of the postaxial or "axillary" border of the scapula).

Neither in Marsupials nor in the Eutherian orders with which comparison has been specially made does the subscapularis present features which call for special remark. It varies for the most part merely in its size relative to other muscles and to its surface origin, and in its degree of attachment to or freedom from the teres major on the one side and the supra-spinatus on the other. In the Dog Humphry* notes that it is partly blended with the supra-spinatus, and in the Mole with the teres major. Freeman,† however, describes it as a small independent muscle in the last-named form.

In *Ornithorhynchus* Owen‡ notes it as a very narrow muscle. I find it relatively rather broad, much exceeding the width of the scapular plate, occupying indeed portions of both inner and outer surfaces. In a recent short paper§ Dr. W. J. S. McKay and the writer have called attention to the significance of this attachment of the subscapularis in the identification of the borders and surfaces of the monotreme scapula.

In *Echidna*, subscapularis, according to Mivart and Westling,‖ is confined to the outer surface of the scapula posterior to the origin of the long head of the triceps.

Dr. McKay and the writer find that in *Echidna* the muscle arises largely as Mivart describes it, but that in addition it arises from the whole of the *actual* posterior border of the scapula, and slightly encroaches upon the inner aspect of the bone, when its limit is indicated by a faint ridge near the margin.

The muscle which Leche¶ takes for subscapularis in *Ornithorhynchus* is certainly not the homologue of the true subscapularis, which he rightly recognises in *Echidna*, but corresponds to that which Westling names the subscapularis accessorius in *Echidna*. The true subscapularis in *Ornithorhynchus* is erroneously described by Leche as a large second part of teres major (*q.v.*).

M. teres major (figs. 6 and 7, *t.m.*) arises from the posterior (post-scapular) angle of the scapula, which forms a backwardly prolonged horn of the crescentic base or mesial border of the bone (*vide* fig. 8), and from a tendinous intersection between it and the adjacent axillary border of the M. subscapularis.

Its origin from bone is narrow and tendinous, and from it the muscle spreads out somewhat in its course towards the proximal part of the shaft of the humerus, into which it is inserted, under

* xx., page 158, Note. † xi., page 214. ‡ xlv., Vol. iii., page 5. § lxiv. xxxix., page 384. ¶ xxvi., page 796.

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cover of the biceps muscle, into the inner lip of the bicipital groove.

The muscle is quite free from the latissimus dorsi. Its origin is excluded from the axillary border of the scapula by the greatly extended scapular head of the triceps, which occupies the whole of that border lying close to the subscapular muscle.

The muscle in Marsupials is usually well developed, and has the ordinary attachments. It is frequently in connection with the latissimus at its insertion (*e.g.*, *Thylacinus**), and with the subscapularis near its origin. In no case is it excluded from the axillary or posterior margin, as in *Notoryctes*.

In *Ornithorhynchus*, Owen† notes a large teres major. Leche‡ describes it as consisting of two quite separate and well-developed portions, the larger of which, doubtless, corresponds to a muscle which Meckel§ regards as the separately developed scapular portion of the latissimus, while the other, deeper, shorter, and thicker, corresponds to the teres major of the latter author. As already stated, it is the first part of Leche which is the true teres major. His second part is subscapularis.

In *Echidna*, Mivart‖ correctly notes it as a small muscle tendinous at origin and insertion, arising from the recurved posterior angle of the scapula, and inserted into the prominent ridge running down from the lesser tuberosity.

In *Chlamydophorus*¶ the muscle is large, and "occupies an extensive area of the posterior margin of the post scapula." It is attached to the subscapularis, as also in *Tatusia* and *Dasypus*,¶ while in all these it is separate from the latissimus.

In some other Edentates, however, it is united with the latter at its insertion.

In *Cyclothurus*** it is a huge muscle, arising from axillary border, and also from spine of scapula, and having close relations to the scapular triceps, as well as to the latissimus. Galton†† notes that Cuvier regarded the muscle as part of the triceps, but maintains that at least the fibres arising from the scapular costa are to be regarded as teres. Humphry‡‡ speaks of the whole muscle as teres; and in the same animal he notes a strap-like portion of muscle which passes from the angle of the scapula, with the latissimus, to be inserted into the inner side of the *olecranon* and partly into the inner side of the forearm. He is doubtful whether this belongs to latissimus or teres.

Macalister§§ notes that in *Orycteropus* and *Tatusia* dorso-epitrochlear fibres arise from the teres major.

In *Orycteropus* Galton notes the muscle as at its origin completely fused with the scapular triceps.‖‖

In the Mole¶¶ the teres major is very large, "perhaps more hypertrophied than any of the arm muscles," arising from upper two-thirds of axillary border, a broad surface on the vertebral border, by an additional slip from the anterior part of vertebral border, and from

* iv., page 8. † xlv., page 6. ‡ xxvi., page 795. § xxxvii., page 26. ‖ xxxix., page 384. ¶ xxvii., page 245. ** xvi., page 248. †† xvi., page 249. ‡‡ xxii., page 35. §§ xxvii., page 246. ‖‖ xv., page 378. ¶¶ xi., page 213.

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interscapular ligament. Its tendon of insertion is largely united with the latissimus.

In *Chrysochloris** it arises as a bicipital muscle, but the heads unite with each other and with the latissimus towards their insertion.

M. teres minor is entirely absent.

Amongst *Marsupials* it is absent as a rule, according to Meckel.† It is present, however, in Cuscus, and Thylacine, Koala‡ occasionally,§ *Dasyurus viverrinus*, and *Phalangista vulpina*,‖ though in the latter Macalister could not separate it from the infraspinatus.

Cuvier and Laurillard figure it in *Macropus giganteus*.¶

In *Phascolomys* and *Sarcophilus*** Macalister found it represented by a fibrous band merely.

It is said to be entirely absent in the *Monotremata*.†† I cannot, however, think that sufficient consideration has been given to the claims of the small muscle, which Westling‡‡ names "subscapularis accessorius" in *Echidna*, to represent a teres minor. I have already pointed out that it is the homologue of this muscle in *Ornithorhynchus* which Leche erroneously describes as the subscapularis in that animal. In point of fact there is no essential difference between *Ornithorhynchus* and *Echidna* in respect of the arrangement of the muscles of this region For details of this arrangement I must refer to Dr. McKay's forthcoming account of the myology of the region in the two forms. But I have satisfied myself from that gentleman's dissections that the little muscle in question does not correspond with any other typical muscle of the region if we except the teres minor. It is mentioned by Mivart in *Echidna*§§ as a "small delicate muscle," but he attaches no name to it, and the only view regarding it of which I am aware is Westling and Leche's, according to which it is, in the *Echidna*, a subscapularis accessorius, and in the *Ornithorhynchus*, the subscapularis itself. It is indeed possible that it is a "subscapularis accessorius." It receives its nerve supply from the Nervus axillaris like the subscapularis; but the twig of supply comes off the N. axillaris between the subscapular branch and that for the scapular deltoid, in fact nearer to the latter, with which nerve it is connected by a filament of communication; so that the mode of innervation is at least as consistent with the homology to a teres minor. But further, its position seems to negative its affinity to subscapularis, for the scapular head of the triceps passes between the two, so that the small muscle is contiguous on the other hand to the infraspinatus. A muscle thus arising from the scapula close to the glenoid cavity, intercalated between infraspinatus on the one hand and long or scapular head of the triceps on the other, may surely well enough be teres minor, especially as its innervation is quite conformable to that view of its homology. It is indeed only with regard to its insertion that any serious difficulty arises, for in both *Echidna* and *Ornithorhynchus* the muscle in question is inserted close to the subscapularis, though quite distinct from it, into the dorsal face of the expanded ulnar

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*xxvi., page 796. †xxxviii., page 513. ‡iv., page 8. §lxxii., page 227, and xxviii., page 130. ‖xxxvi., page 117. ¶vi. Pl., page 177-8. **xxix., page 159. ††xxvi., page 795, and xxxix., page 384. ‡‡lxii., page 15. §§xxxix., page 385.

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tuberosity, and separated by a considerable interval from the attachment of the infraspinatus to the dorsal face of the expanded radial tuberosity. Nevertheless there is no intervening structure between the two insertions, and the enormous lateral expansion of the neck of the humerus by means of the projections of the flattened tuberosities, in a plane almost at right angles to that of the projection of the epicondyles, may readily account for the dislocation of the insertion of a muscle which every other test would serve to indicate as teres minor.

Amongst *Edentata* the muscle is generally, though not invariably, present. It is small in *Chlamydophorus*.* It is absent according to Macalister, at least as a muscle distinct from the infraspinatus, in both *Bradypus didactylus* and *B. tridactylus* and in *Cyclothurus*†, though Humphry‡ seems to have found it in the last two, taking for it a slip of the scapular deltoid arising from the scapular spine in Macalister's view†.

Both in *Chlamydophorus*† and *Dasypus sexcinctus*§ it arises from the "lesser" or post-scapular spine of the scapula, the same which is present in *Notoryctes* (fig. 8, *p.s.s.*); and in *Orycteropus capensis*||, where the muscle is present, arising from the axillary costa, outer edge, there passes from the "middle of its inferior edge a strong tendon to the metacromial process of the scapula." This would seem to represent the ligament which in *Notoryctes* extends from the post-scapular spine to the metacromion (fig. 8, *p.s.m. lig.*), bridging over the infraspinous fossa, but here no teres minor fibres arise from it. There can be little doubt that the second or post-scapular spine, when present, is to be regarded as an exaggeration of the dorsal lip of the "axillary" or posterior border of the scapula, from which in *Orycteropus* the teres minor arises. This lip in *Chlamydophorus* and *Dasypus* is fully developed into a post-scapular spine, but still gives origin to the teres minor. The latter muscle in both cases overlaps the triceps, and I think it certain that the exaggerated development of the dorsal lip of the axillary border into a second spine is simply due to a great expansion of the great scapular head of the triceps.

The muscle is absent in the Mole¶ and in *Gymnura*,** but present in the Hedgehog, Cape Golden mole, and others.††

Amongst Rodents it is stated by Mivart and Murie‡‡ to be present in Agouti, and in Rabbit, Hare, and Guinea Pig, but it is closely adherent to the infraspinatus, with which these authors believe Meckel§§ confounded it when he failed to detect its presence in this order.

Meckel§§ states that it is generally absent as an independent muscle in *Carnivora;* it is present, *e.g.*, in *Hyæna striata*, *H. crocuta*, and *Viverra*, according to Young and Robinson.||||

M. infraspinatus (fig. 8, *i.s.*) arises from the deep and narrow postscapular fossa between the meso-scapular (fig. 8, *m.s.s.*) and post-scapular spines (*p.s.s.*). It is smaller than the supraspinatus, and its fibres course outwards, and pass under cover of a narrow ligamentous bridge, which connects the post-scapular spine with the metacromion (fig. 8, *p.s.m. lig.*). It is then in-

* xxvii., page 244. † xxvii., page 245. ‡ xxii., page 33. § xiv., page 530. || xv., page 574. ¶ xi., page 214. ** viii., page 395. †† xxvi., page 795. ‡‡ xl., page 399. §§ xxxviii., page 513. |||| lxxii., page 190.

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serted into the dorsal aspect of the greater or radial tuberosity of the humerus between the insertion of the supraspinatus and the origin of the "outer" humeral head of the triceps (fig. 8, *o.tr.*).

In the Marsupials generally, according to Meckel,* the supra spinatus is larger than the infra-spinatus. The only exceptions, I note, are *Macropus bennettii*† and Koala.‡

In the *Echidna*, Mivart§ describes this muscle as arising from the surface of the scapula between the long head of the triceps and the free margin of the spine and acromion (the actual anterior margin of the scapula); and Westling‖ figures and describes the same muscle. According to Westling, the muscle is innervated chiefly by the Nervus axillaris.

In *Ornithorhynchus* (McKay) the muscle occupies a much greater proportion of the inner surface of the scapula, owing to the ridge for the scapular triceps being much nearer the actual posterior border than is the case in *Echidna*. It otherwise corresponds to that in *Echidna*. It is innervated partly from the N. axillaris, but chiefly from the N. supracoracoideus (suprascapular nerve).

M. supraspinatus (figs. 8 and 15, *s.s.*) arises from the whole of the prescapular fossa, as well as from the preaxial border of the scapula and the prominent anterior angle of the vertebral border. Its fibres form a fleshy mass, which bulges considerably beyond the prescapular border, being in apposition with the fibres of the rhomboideus dorsally, and of the subscapularis ventrally. It passes outwards under cover of the acromion and "meso-scapular segment" to be inserted into the proximal facet upon the greater (radial) tuberosity of the humerus.

Neither among Marsupials nor the Eutherian orders specially noticed does this muscle present any remarkable features.

Among Monotremes the muscle arises from the *actual* inner surface of the scapula, owing to the remarkable modification of the scapula in this order. (See note by Dr. McKay and the writer in Proc. Linn. Soc. N.S.W.)¶

The muscle is supplied by the N. supracoracoideus, which represents the suprascapular nerve.

M. coraco-brachialis is entirely unrepresented in *Notoryctes*.

In no other Marsupial recorded is the coraco-brachialis absent, though in Wombat Macalister** describes it as "extremely small and rudimentary," while in several others only the coraco-brachialis brevis element is present, *e.g.*, *Thylacinus*,†† *Dasyurus*,‡‡ and *Myrmecobius*, *Chironectes*, and *Halmaturus*.§§

In the *Echidna* the coraco-brachialis system of fibres is extremely luxuriant, where it consists of the three distinct elements, which Wood‖‖ regards as constituting the typical muscle. One of the elements is, however, epicoraco-brachial in its attachments.

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* xxxviii., page 499. † iv., page 9. ‡ lxxii., page 226, and xxviii., page 130. § xxxix., page 384, and Pl., page 52., figs. 1 and 2, *i.s.* ‖ lxii., Taf. ii., fig. 5. ¶ lxiv. ** xxix., page 160. †† iv., page 10. ‡‡ xxxvi., page 118. §§ xxvi., page 803. ‖‖ lxxi., page 45, *et seq.*

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In the *Ornithorhynchus* the epicoraco-brachialis is fused with the coraco-brachialis brevis, so that only two distinct elements are present.

Amongst the *Edentata* it is entirely absent in *Cyclothurus* and *Pholidotus*.* In *Chlamydophorus** Macalister found it represented by a "very diminutive 'short variety,'" while Hyrtl† had found it absent in the specimen he dissected.

Leche states‡ that it is absent among the *Talpidæ*, but Wood§ states that the short variety is present in the Moles. The latter author found the middle variety alone in the Hedgehog, while Leche mentions long and short as present in that animal. Dobson‖ states that the muscle is entirely absent in *Gymnura*.

In Guinea Pig and Rabbit Wood¶ found the middle variety alone, in the Hare and Capybara the short only, and in Squirrel and Porcupine the long. In other Rodents two varieties co-existed.

Among *Carnivora*** the muscle is single in some, *e.g.*, short variety only in Dog and Cat, or two varieties may consist as in the *Ursidæ*.

M. biceps flexor antebrachii (figs. 6 and 7, *f.b.c.*) takes origin by one head only (the "long"), by means of a fine tendon, from the "upper" extremity of the glenoid margin at the root of the rudimentary coracoid. The tendon traverses the capsule of the shoulder joint to enter the bicipital groove between the tuberosities. Emerging from the capsule, it gives place to a narrow and somewhat ribbon-like muscle, which broadens somewhat as it descends to reach the region in front of the elbow. During nearly the whole of its course in the arm it is covered by the pectorals, and lies ventral to the teres major and inner part of the humeral triceps (fig. 6, *ih.tr.*).

Towards its insertion it is covered by the pronator radii teres (fig. 10). It is inserted into the tuberosity of the radius in close proximity to the insertion into the coronoid process of the brachialis anticus muscle, whose tendon it crosses, and with which it has a slight fascial connection.

Macalister,†† writing on "the homologies of the flexor muscles of the vertebrate limb," regards the flexors in both arm and leg as typically four in number.

These are, in the arm, 1st, *Coraco-radial*, which is "most frequently present, and most strikingly retaining its typical position and attachments"; 2nd, a *humeral head* of the biceps (only occasionally present in man); 3rd, the *gleno-ulnar* (corresponding to the long head of the biceps together with the aponeurotic tendon of insertion in man, hence the muscle is here *gleno-fascial*, not gleno-ulnar, as in other forms); 4th, the *brachialis anticus* portion of the flexor mass.

With regard to the first-named of these flexor elements, Macalister, however, remarks:—"In cases where the coracoid process is not developed, we sometimes find that the first muscle originates from a tendon which corresponds with the typical origin of this flexor; and

* xxvii., page 247. † xxiv., page 36. ‡ xxvi., page 804. § lxxi., page 52. ‖ viii., page 395. ¶ lxxi., page 52. ** lxxi., page 51. †† xxxi., page 287.

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hence we have the compound gleno-radial muscle of the ruminants, in which, however, as Meckel indicates, a trace of a division may be seen," &c.

The condition just described is the condition of the biceps in *Notoryctes, i.e., gleno-radial,* but there it presents no trace of its composite character.

Amongst Marsupials the same author* describes the condition in the Giant Kangaroo and Wallaby as follows:—"The biceps is divided into two parts for its entire extent. Of these, the coracoid is generally the larger, and seems to be inserted into the tubercle of the radius; the glenoid origin is smaller and, as usual, tendinous; crossing the head of the humerus and crossing the coraco-radial muscle, it is inserted with the ulna in company with the brachialis anticus, &c." . . . "In *Didelphys* and *Phalangista* the muscles are similarly arranged, as they are likewise in all the other *Marsupials* which I have examined."

In *Myrmecobius*† the same elements of the biceps are present, but at their origin they are fused into a tendon, coraco-glenoid in attachment, which is quite outside the capsule of the shoulder-joint. Somewhat similar partial union of the coraco-radial and gleno-ulnar elements is found in *Didelphys* and in *Chironectes* according to Leche,† while in *Thylacinus*‡ and *Dasyurus*§ the tendons of origin are separate at their commencement. The bellies of the muscle in Cuscus and *Phascologale*‡ are separate throughout, the tendons of origin being partially fused.

In *Perameles*|| there is no coracoidal head, but the insertion is radio-ulnar.

In *Echidna* Westling¶ describes two incompletely separated portions. The smaller is epicoracoidal, rising close to the "epicoraco-humeral" muscle; the larger arises from the coracoid and from part of the tendon of the coraco-brachialis longus. Mivart** describes the muscle with these origins as a single mass, inserted into both radius and ulna. According to Westling it is the smaller epicoracoid portion which passes by a long thin tendon to the ulna.

In *Ornithorhynchus*†† the muscle is bicipital, one head epicoracoidal, the other coracoidal. Both are inserted into the middle third of the radius.

In *Chlamydophorus*‡‡ biceps is "a slender muscle which arises by one head from the root of the coracoid process on its inner side at the margin of the glenoid cavity," It is inserted into a pit in front of the coronoid process of the ulna. It is similar in *Tatusia*.‡‡

In *Dasypus* it has a radial as well as an ulnar insertion, and it has *sometimes* a coracoid head of origin, either independently or from the coraco-brachialis muscle, in addition to the constant glenoid one.

In *Cyclothurus*‡‡ the muscle is glenoid in origin, and is inserted partly with the brachialis anticus to the ulna and partly into the tubercle of the radius.

In *Orycteropus*§§ it is gleno-radial, but receives the clavicular deltoid

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* xxxi., page 284. † xxvi., page 798. ‡ iv., page 11. § xxxvi., page 119. || xlv., page 12. ¶ lxii., page 18. ** xxxix., page 385. †† xlv., page 8, and xxvi., page 798. ‡‡ xxvii., page 246. §§ xxvii., page 247.

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which is inserted with it. Humphry* found it arising from the fore part of the coracoid.

In *Pholidotus*† it is a simple gleno-ulnar muscle.

In *Bradypus tridactylus*† it is radial in insertion, and it has a glenoid and a humeral head of origin, while Humphry‡ found a third slip arising from the coracoid, and Meckel§ found a slip from the deltoid.

Among the *Insectivora* there is almost always only a glenoid head. The muscle is ulnar in its insertion in *Gymnura*,‖ *Erinaceus*, and *Chrysochloris*,¶ radial in *Talpa*,** and radio-ulnar in some others. In *Talpa*** it is a very considerable and curiously modified muscle.

In the Rodents usually only a glenoid head is present, usually inserted into the ulna. It is, however, gleno-radial in *e.g. Erethizon*.††

It is generally gleno-radial in *Carnivora*.

M. brachialis anticus, s. *internus* (figs. 6, 8, and 10, *b.a.*), arises from the concave outer surface of the shaft of the humerus, extending as far up as the region of the neck. Here an oblique line separates it from the proximal part of the origin of the "outer" humeral head of the triceps (fig. 8, *ot.r.*), whose fibres in this region encroach upon the outer surface of the neck of the bone, extending dorsally to the base of the radial tuberosity, and thus separating brachialis anticus from infra-spinatus. Below the oblique line mentioned the brachialis anticus is separated from the triceps by a continuation upwards of the supinator crest of the humerus. Fibres of the muscle also arise from the concave inferior and outer aspects of the prominent delto-pectoral ridge (fig. 8, *d.p.tub.*).

The muscle is inserted into the sharp ridge leading distally from the coronoid lip of the humero-ulnar articulation, which lies in close apposition to the head of the radius.

In *Thylacinus*‡‡ the muscle arises from the posterior aspect of the shaft of the humerus by a linear origin, covered by the outer head of the triceps, though separated from it by a well marked external intermuscular septum. It merely clothes the outer aspect of the bone.

In Cuscus and *Phascogale*,‡‡ however, its fibres arise from the outer side of the shaft.

In *Dasyurus*§§ its origin is from both "posterior and anterior surfaces of the humerus," extending internally as far as the inner border of the bone, and externally as far as the insertion of the deltoid. Posteriorly it extends as high as the origin of the outer head of the triceps, which separates it from the teres minor insertion.

In Wombat‖‖ the muscle was "as usual, in position and attachments, winding round the bone below and external to the deltoid crest, lying in a deeply excavated sulcus in the humerus." Macalister states that "its position is similar in *Sarcophilus*, the Bandicoot, Opossum, Phalanger, Bennett's and Giant Kangaroo."‖‖

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* xxi., page 300. † xxvii., page 246. ‡ xxii., page 37. § xxxviii., page 520. ‖ viii., page 395. ¶ xxvi., page 799. ** xi., page 215. †† xli., page 282. ‡‡ iv., page 11. §§ xxxvi., page 120. ‖‖ xxix., page 161.

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In Koala* Young describes the muscle as arising from the whole of the outer surface of the shaft of the humerus, and inserted in common with the gleno-ulnar moiety of the biceps

In *Echidna*† the muscle is small and delicate, arising from the outer side of the shaft of the humerus, and closely embraced externally by supinator longus.

In *Ornithohynchus* also it is said to be intimately related to the supinator longus (v. infra, p. 42), and here it is innervated both by the N. medianus and M. radialis.‡ It is inserted into the radius.

In *Chlamydophorus*§ the muscle is large and, as in *Notoryctes*, is separated from the biceps by the deltoid tuberosity. Below, however, they are connected and inserted in company.

The insertion is radio-ulnar in *Bradypus tridactylus*,§ and there is a radial slip also in *Orycteropus*,‖ where also it receives a slip from the biceps.

In *Talpa*¶ its origin is from the upper part of the outer surface of the humerus and from the hook-like process on the outer tuberosity. It is ulnar in insertion.

In *Erinaceus*** and *Gymnura*†† it is inserted into the radius.

It is altogether absent in *Chrysochloris*‡‡.

In several Rodents§§ (*Dasyprocta*, *Lepus*, *Cuniculus*, &c.) the muscle is divided into two distinct parts, and is ulnar in its insertion.

M. triceps extensor antibrachii (figs. 1, 4, 5, 6, 7, and 8, *tr.*, *s.tr.*, *i.h.tr.*, and *o.tr.*) forms a relatively large muscular mass extending dorsad of the region of the axilla. Its origins are scapular and humeral, and the humeral origin is partially separated into "outer" and "inner" heads.

The scapular origin (figs. 6-8, *s.tr.*) is very extensive. It arises from the whole of the actual posterior border of the scapula from the glenoid origin to the recurved posterior angle of the vertebral border. It also arises from the whole length of the secondary or post-scapular spine of the scapula, and from the whole of the surface intervening between this and the posterior margin of the bone.

Part of this origin is crossed dorsally by the fibres of the spino-deltoid arising from the meso-scapular spine.

The humeral fibres of the muscle arise from the whole of the morphologically dorsal aspect of the humerus. The "outer" head (fig. 8, *o.tr.*) arises from the proximal part of this surface of the shaft, extending outwards as far as the upper end of the ectocondylar ridge, where, and above which, its outer marginal fibres are parallel with and closely applied to the outer margin of the brachialis anticus. Lower down the outer margin is in superficial apposition (behind the ectocondylar ridge) with the proximal margin of the anconeus externus. The highest part of

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* lxxii., page 227. † xxxix., page 386. ‡ xxvi., page 804. § xxvii., page 247. ‖ xv., page 576. ¶ xi., page 215. ** xxvi., page 804. †† viii., page 395. ‡‡ xxvi., page 804. §§ xl., page 399.

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the origin of this head extends upon the dorsal or radial aspect of the radial tuberosity, and there encroaches upon the outer aspect of the bone distal to the insertion of the infraspinatus muscle. From the latter it is limited by an oblique line running spirally round the neck of the humerus for a short distance. In the distal half of the brachium this head lies superficial to the lower part of the origin of the "inner" head of the muscle, and its inner margin is thinned out upon the surface of the latter, though not quite separate from it. About the middle of the brachium the musculo-spiral nerve winds forwards between the two layers (outer and inner heads) in order to reach the ventral aspect of the limb above the prominent part of the ectocondylar crest.

The "inner" head (figs. 6 and 7, *i.h.tr.*) is more massive than the "outer." Proximally it reaches up beyond the insertion of the teres major. In one specimen the tendinous layer on the ventral aspect of this head was found to extend upwards ventrad of the insertion of the teres major, while the proper fleshy fibres of the bend reached up dorsad of the same muscle. The ventral tendon was certainly of the nature of internal intermuscular septum, muscular fibres arising from its dorsal aspect, and I may hazard the conjecture that its prolongation upwards in front of the teres major represented the faint remnant of a coraco-brachialis muscle which is otherwise entirely unrepresented in this animal.

Short fibres of the inner head of the triceps fill up the great space in the lower part of the brachium between the humerus and the olecranon. These fibres are covered by the outer head, and the outer margin of this part of the muscle is in deep apposition with the proximal border of the anconeus externus muscle, from which indeed it is not very definitely separable. The scapular head forms a thick but superficial lamella of the muscle, which is inserted along the extensive convex edge of the recurved olecranon. A few of its most postaxial fibres adjacent to the latissimus dorsi terminate along with the latter in the aponeurosis of the forearm.

The fibres of the humeral heads of the muscle form a deeper fleshy stratum also inserted into the olecranon beneath the scapular fibres. They are only continuous with the latter at their insertion.

The question of the representation of the dorso-epitrochlearis muscle has already been discussed, and a summary of the morphology of this muscular element in mammals under the name of *M. anconeus quintus* will be found in a memoir upon the subject by Wenzel Gruber.*

* lviii., page 9, *et seq.*

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The triceps seems to be a strongly developed muscle in all Marsupials.

In *Thylacinus* the origin of the scapular head is extensive, according to Cunningham,* reaching along the whole length of the posterior margin of the scapula. In most other cases, however, the scapular origin does not occupy more than a third or a half of that border, and there is in no case an extension of the muscle upon the outer surface of the bone such as is correlated in *Notoryctes* with the development of the post-scapular spine.

The outer and inner humeral heads are stated by Macalister† to be inseparable from each other in Marsupials, but this is by no means universal‡, nor is it so in *Notoryctes*.

The triceps in Monotremes is an exceedingly extensive and powerful muscle, especially in *Echidna*. The scapular part arises in the latter from a well-marked crest on the outer surface of the scapula, which extends dorsally from the lower (ventral) end of the scapula to near the vertebral border. This tricipital crest has been regarded by Flower and Gadow as the morphological post-scapular border, and this view has been elsewhere discussed by Dr. W. J. S. McKay and the writer.§ We cannot confirm Meckel's description of a segmentation of the scapular triceps into three parts|| in *Ornithorhynchus*.

The outer humeral head in *Echidna* is probably represented merely by a small tendinous slip arising external to the origin of the supinator longus from the base of the radial tuberosity. It is separated from the very large inner humeral head by the musculo-spiral nerve. The inner head occupies the entire posterior surface of the shaft of the humerus (Mivart¶).

It is amongst the *Edentata* that we meet with the closest parallelism to the condition of the triceps in *Notoryctes*. This is owing to the very similar development in many members of the order of a second or post-scapular spine. A comparison between fig. 8 and Macalister's fig. 24,** representing the corresponding region in *Chlamydophorus*, is rather striking. But in *Notoryctes* I have not found that the scapular triceps is divisible, as in *Chlamydophorus*, into three portions; while in the latter animal again the humeral triceps is one and indivisible, and evidently proportionately smaller than in *Notoryctes*. In *Dasypus*†† there are two scapular origins, the largest being from the whole length of the post-scapular spine. In *Cyclothurus*,‡‡ where a post-scapular spine is present near the actual hinder margin of the scapula, there is no division of the scapular triceps into distinct heads. In *Bradypus* also it is undivided. Giebel§§ regards the post-scapular spine (well developed, *e.g.*, in *Myrmecophaga tetradactyla*) as the true morphological posterior border (post-scapular) of the scapula. Its development in the form of a second spine seems correlated with a very considerable development of the scapular triceps.||||

Certain Rodents exhibit an approach towards a post-scapular ridge, *i.e.*, a marked exaggeration of the outer or dorsal lip of the "axillary" border of the scapula. This is notable in *Arctomys*,¶¶ but I do not

* iv., page 11. † xxix., page 161. ‡ iv., page 11, and xxxvi., page 121. § lxiv. || xxxvii., page 27. ¶ xxxix., page 386. ** xxvii., Pl. xv., fig. 24. †† xiv., page 538. ‡‡ xxvii., page 248, and xlvii., Pl. 22, fig. 18. §§ xviii., page 408. |||| Cf., lxiv. ¶¶ xviii., Pl. 71, fig. 11, and xlvii., Pl. xxiv., fig. 14.

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know whether it is there associated with a special development of the scapular triceps. Mivart and Murie note that in *Dasyprocta* (and in Rabbit, Hare, and Guinea-pig)* the usual three heads are present with the usual origin and insertions. The scapular head is large and arises partly from fascia over infraspinatus.

In *Talpa*† the triceps is large and tricipital. The scapular head arises from the glenoid end of axillary border or from three-fifths of the length of the infraspinous fossa. In the *Erinaceidae* the triceps is "enormous in comparison with the size of the animal."‡ It arises by a scapular and two humeral heads.

Among the *Carnivora* a post-scapular spinous ridge is figured by Giebel in *Ursus arctos*,§ while Windle‖ in the same genus describes the scapular triceps as arising from the "whole of the axillary border." Cuvier and Laurillard figure such a form of the scapular triceps in *Ursus Americanus*;¶ and in *Ursus meles*** they likewise figure a *double* scapular triceps, the hinder portion being long and slender (noted as a *fifth extensor*), and arising close to the vertebral end of the "axillary border" (and doubtless from the dorsal portion of such a tricipital ridge or post-scapular spine as is present in *Ursus arctos*.) This origin overlaps dorsally the origin of the teres major.

In some cases where such a posterior, or rather post-axial, sector of the scapular triceps is present it appears to be more or less closely associated with the dorso-epitrochlearis (Cuvier and Laurillard's fourth extensor; Wenzel Gruber's anconeus V.). Such a condition of partial union is noted by Galton as present in *Orycteropus capensis*††, and in *Dasypus sexcinctus*.‡‡

On the general morphology of the extensor mass in the arm in *Mammalia c.f.* memoir by Wenzel Gruber.§§

M. anconeus externus seu *quartus*, seu *epicondylo-anconeus* (W. Gruber) (figs. 8, 9, and 17 *an.e.*). This is a comparatively large muscle, somewhat rhomboidal in form, and arising from the back of the ectocondylar ridge of the humerus in its prominent lower third. Its fibres are directed backwards and distally towards the ulna, to be inserted into the base of the olecranon and the proximal half of the postaxial border of the shaft of the ulna.

Its attachment to the ulna is crossed by the belly of the M. extensor indicis et medii digiti, which runs along the shaft of the bone.

The proximal border is parallel with the lateral border of the humeral triceps, superficially with the outer head, but deeply it is in apposition with the short fibres of the inner head, from which indeed it is not absolutely separable by any very marked segmentation cleft.

Its distal border is parallel and in apposition with the ulnar border of the extensor carpi ulnaris (fig. 9, *e.c.u.*).

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* xl., page 400. † xi., page 215. ‡ viii., page 395. § xviii., Pl., 72, fig. 5. ‖ lxvi., page 83. ¶ vi., Pl. 85-6. ** vi., Pl. 102. †† xv., page 578. ‡‡ xiv., page 539. §§ lviii., page 8, *et seq.*

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According to Cunningham,* this muscle varies greatly in the different members of the order *Marsupialia*, in which, however, it is very generally present.

In *Thylacinus* he describes it as hardly existent, while in *Phascogale*, and especially in Cuscus, it is largely developed.

In *Myrmecobius fasciatus* Leche† describes it as especially strongly developed. From his figure it does not appear to be proportionately so largely developed as it is in *Notoryctes*.

In *Phalangista vulpina*‡ it extends over the upper two-fifths of the outer border of the ulna as a very considerable muscle.

In *Echidna* Westling§ notes the anconeus externus ("quartus") as arising from the dorsal aspect of the ectocondyle, and inserted into a depression on the external face of ulna (olecranon and shaft), extending distally as far as the extensores digit. com. and carpi ulnaris.

In *Ornithorhynchus* a well-developed anconeus externus is also present. According to St. John Brooks,‖ it arises in common with the extensor carpi ulnaris from the external condyle, and is inserted into the upper third of the ulnar shaft. (This author¶ regards the anconeus externus of the vertebrate forelimb as morphologically related more nearly to the extensor carpi ulnaris than to the inner head of the triceps, and as constituting along with the former the ulnar sector of the superficial layer of the extensor mass in the antibrachium. Its "tendency to unite with the triceps" he regards as a secondary, and not as a primary, characteristic. The condition in *Notoryctes* would agree equally well with either view of the affinities of the muscle, but the evidence from mere topographical relationship is of little value.)

In *Chlamydophorus*** the anconeus externus is comparatively small, and it is overlapped by the humeral triceps, and in *Tatusia* the condition is similar.†† Humphry†† notes that in *Cyclothurus* (*Myrmecophaga*) *didactyla* it extends down nearly the whole length of the outer surface of the ulna between the extensor carpi ulnaris on its outer side, and the flexores digiform and carpi ulnaris internally, these three muscles (four ?) forming an almost continuous sheet. In *Manis*, too, the same author describes the anconeus externus as large.

Amongst the *Insectivora* Dobson‡‡ notes the presence of the anconeus externus only in the *Talpidæ*. In *Talpa Europea* the muscle, according to Freeman,§§ consists of two parts, a posterior rounded fusiform fasciculus arising from tip of the styliform external condyle and inserted into the outer projection of the olecranon. The anterior portion is thin and fan-shaped, arises in common with the preceding, and "becoming aponeurotic as it passes over the extensor muscles of the forearm, is inserted into the prominent crest of the ulna."

Cuvier and Laurillard figure a well-developed anconeus externus in the Hedgehog as well as in the Mole.‖‖

The anconeus externus appears to be but slightly developed (generally absent ?) amongst Rodents. However, Cuvier and Laurillard figure the muscle in *Sciurus* (pl. 204) and in *Arctomys* (pl. 207), where it is indeed rather well marked.

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* iv., page 12. † xxvi., page 806. ‡ xxxvi., page 122. § lxii., page 20. ‖ i., page 9. ¶ i., pages 1 and 13. ** xxvii., page 248. †† xxi., page 39. ‡‡ Quoted by Leche, xxvi., page 806. §§ xi., page 215. ‖‖ vi., Pl. 80, fig. 1 *u*, and Pl. 75, fig. 1 *u*.

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The muscle, so far as I know, presents nothing worthy of note amongst the *Carnivora*.*

M. anconeus internus, seu *epitrochleo-anconeus* (figs. 6 and 7, *an. i.*). This forms a short, moderately thick, and somewhat rounded muscle, arising dorsad of the internal (ulnar) epicondyle (epitrochlea), and directed backwards to the concave aspect of the curved and beak-like olecranon, into which it is inserted not far from the tip. The fibres of the muscle are in series with those of the inner head of the triceps proximally. At its distal border there is a triangular intermuscular interval, bounded distally by the epitrochlear and olecranon heads of the M. flexor carpi ulnaris (figs. 6 and 7, *f.c.u.*), and proximally, of course, by the anconeus internus itself. [I found no trace of a fibrous arch uniting the two heads of the flexor carpi ulnaris, to which the distal border of the anconeus internus is attached in various other marsupials *(Cuscus, Dasyurus)*.†]

As usual, the ulnar nerve passes down into the forearm under cover of the muscle.

The anconeus internus has been described in all Marsupials whose myology is recorded, and its character and relations seem much the same in all.‡

It is figured, as well as described, in *Dasyurus viverrinus* by Wenzel Gruber in his monograph upon this muscle§ ; *c.f.* also MacCormick.‖ Figures of the muscle also appear in Cuvier and Laurillard (*Macropus major*),¶ and in Galton's paper on the muscle (*Phascolomys*),** as well as in Cunningham's Memoir†† (Cuscus).

The muscle is also well developed in the Monotremes. It is described and figured in *Echidna* by Westling.‡‡ Mivart has not recognised it as a distinct muscular element, but Galton has both described and figured it on this genus.§§

In *Ornithorhynchus* the muscle has been described by Wood,‖‖ though Meckel does not refer to it, nor do Cuvier & Laurillard figure it. I find it a well-developed muscle in dissections by Dr. McKay, and Coues¶¶ also notes it as a muscle of considerable size (his "*Antanconeus*").

The nerve supply in *Echidna* is stated by Westling*** to be from the N. radialis profundus. In all other cases the nerve has been found to come from the ulnar nerve; even in *Ornithorhynchus*. Dr. W. J. S. McKay has informed me that he can corroborate the statement in reference to *Ornithorhynchus*, and with regard to *Echidna*, he finds that the nerve comes from the "nervus radialis profundus," as Westling states, but that in one case it came off from that nerve along with an ansal branch of communication between the ulnar nerve and the "nervus radialis profundus."

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* Cf. vi. † iv., page 12, and xxxvi., page 122. ‡ iv., page 13, gives various references. § lix., page 17, and Pl. ii., fig. 1. ‖ xxxvi., page 122, and figs. 2, 6, and 8. ¶ vi., Pl. 195, fig. 1 *u*. ** xvii., fig. 3. †† iv., Pl. ii., fig. 4. ‡‡ lxii., page 22, and Taf. iv., fig. 12 *E.a.* §§ xvii., fig. 4. ‖‖ lxix., page 497. ¶¶ iii., page 150. *** lxii., page 22.

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In *Chlamydophorus* Macalister* notes this muscle as "very large, and related as usual." The muscle is stated by Galton† to be well developed throughout the whole of the *Edentata*, and his paper, as well as Gruber's,‡ may be consulted for further information.

Dobson (quoted by Leche)§ notes the presence of the muscle in the *Talpidæ* only amongst *Insectivora*. Gruber, however,‖ describes it in several others, including *Erinaceus* and *Sorex*.

It is very largely developed in *Talpa*.¶

In Rodents it is almost invariably present as an independent muscle, and in the *Carnivora* also it is usually to be recognised as such.

The morphology of this muscle is treated of at length in Gruber's and Galton's papers already referred to.**

Muscles of the Forearm.

In describing the muscles upon the extensor aspect of the forearm and hand we may conveniently adopt the schematic classification suggested by Dr. Brooks†† on the lines laid down by Humphry.‡‡

According to this scheme we have to recognise three longitudinal sectors of the extensor mass in the forearm, each being further subdivisible into a superficial and a deep stratum. The three sectors are distinguished as radial, ulnar and intermediate, and the superficial elements of these may first be described.

Ordinarily among mammals the superficial radial sector consists of Mm. supinator longus and brevis and extensor carpi radialis, which may be segmented into "longior" and "brevior" portions. (The supinator brevis is regarded by Brooks as delaminated from the more superficial supinator longus. Its description will, however, be deferred until the more superficial muscles are noticed.)

M. supinator longus is unrepresented in *Notoryctes*.

This muscle is generally present in Marsupials, but it is lacking in *Sarcophilus*, according to Macalister.§§ Cunningham found it in *Thylacinus*‖‖ "very feebly developed," consisting only of a narrow fleshy band arising from the upper part of the ectocondylar ridge. In Cuscus and *Phascogale* it was relatively a very large muscle.¶¶ In *Dasyurus**** it is small and narrow, while in Koala††† it is enormous. In *Petaurista taguanoidis*‡‡‡ Haswell found it inserted into the scaphoid. Leche§§§ found it united with the extensor carpi radialis in *Myrmecobius*. Macalister‖‖‖ suspects that the muscle described by Owen¶¶¶ in *Perameles* as supinator longus is really an extensor carpi radialis. St. John Brooks**** holds that the muscle is absent in *Ornithorhynchus*, and Meckel†††† also omits all mention of it. Neither do Cuvier

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* xxvii., page 248. † xvii., page 171. ‡ lix., *loc. cit.* § xxvi., page 808 ‖ lix., page 13. ¶ lix., page 14. ** lix. and xvii. †† ii., p. xv., and i., pp. 1, *et seq.* ‡‡ xxii., page 46. §§ xxx., page 19. ‖‖ iv., page 13. ¶¶ iv., page 14. *** xxxvi., page 123. ††† xxviii., page 130, and lxxii., page 228. ‡‡‡ xix., page 176. §§§ xxvi., page 810. ‖‖‖ xxix., page 164. ¶¶¶ xlv., page 13. **** i., page 9. †††† xxxvii.

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and Laurillard figure it. But Coues* names as supinator longus the muscle which Brooks regards as extensor carpi radialis longior. Coues' view is certainly erroneous.

Mivart describes a supinator longus in *Echidna*,† though he inserts a query to the name; and the same muscle is also described and figured by Westling‡ as fused at its origin with the brachialis anticus, and as supplied by the median nerve along with the latter muscle.

In dissections by Dr. McKay I find no separation of supinator longus from brachialis anticus (in fact no satisfactory indication of a supinator longus at all) in *Ornithorhynchus*, while in *Echidna* there is a very well marked segmentation of a supinator longus parallel with and close to the brachialis anticus.

In *Chlamydophorus* and *Tatusia*§ the muscle is absent, as also in *Dasypus*‖; but in most *Edentata* it appears to be present.

It is absent in all *Insectivora* and *Rodentia*,¶ but generally present in *Carnivora*. It is absent, *e.g.*, in *Hyæna striata* and *Proteles*.**

M. extensor carpi radialis (figs. 6, 7, 9, 10, 12, and 17 *e.c.r.*) arises from the ectocondylar ridge and from the septa between it and the adjacent muscles.

It is a large fleshy muscle (indivisible into segments), ending in a stout tendon which descends dorsad of the prominent radial styloid and passes under cover of the extensor ossis metacarpi pollicis which crosses it just below the styloid. Still more distally it is crossed (close to its insertion) by the indicial extensor tendon. Its insertion is into the dorsal aspect of the base of the metacarpal of the third digit.

There is no trace of a second radial extensor, and the muscle present corresponds from its insertion rather to the ext. carpi rad. brevior. The entire absence of a portion of muscle or tendon representing the long extensor is doubtless correlated with the peculiar condition of permanent opposition and partial flexion of the metacarpals of both pollex and index in the highly modified manus of this animal.

Cunnigham notes that the fleshy bellies of the radial extensors of the carpus are completely amalgamated in *Phascogale*, though the tendons were separate. In Cuscus and one specimen of *Thylacinus* the same author found the muscles quite separate, while another specimen of *Thylacinus* resembled *Phascogale* in this respect.††

MacCormick‡‡ found in all the specimens of *Dasyurus* examined by him (and of *Phalangista ?*) that the muscles were fused throughout, the single tendon being inserted into the metacarpal of the third digit. But in most marsupials its insertion is into the metacarpals of both second and third digits. Young found the muscles in Koala§§ fused in some cases, separate in others. Macalister‖‖ mentions one muscle only in *Macropus bennettii*, *Phascolomys sarcophilus*, *Phalangista*, and *Macro-*

* iii., page 153. † xxxix., page 386. ‡ lxii., pages 19 and 25. § xxvii., page 255. ‖ xiv., page 540. ¶ xxvi., page 810. ** lxxiii., page 191. †† iv., page 14. ‡‡ xxxvi., page 123. §§ lxxii., page 229. ‖‖ xxix., page 163.

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pus major, but as inserted in these forms into both second and third metacarpal. He also notes a single tendon only in *Didelphys*, where Meckel describes a double muscle.* Both radial extensors are present in *Petaurista*.†

In *Echidna* Mivart‡ describes both long and short extensors, the former inserted into the scapholunar, and the latter into the third metacarpal. Westling gives a similar account.§

In *Ornithorhynchus* Brooks‖ notes substantially the same arrangement, only the long extensor is inserted into the first metacarpal, and the ligaments on the dorsum of the carpus.

Coues' nomenclature¶ of the muscles of this region is different, but I do not think his view of the homologies can be upheld.

In *Chlamydophorus* there is only one radial extensor, but two tendons are present, according to Macalister,** inserted into metacarpals of index and medius. Hyrtl†† only gives the former insertion. Among other *Edentates* a like condition obtains to that noted by Macalister, but often only an insertion into the third metacarpal is found, *e.g.*, *Cyclothurus*‡‡ and *Orycteropus*.§§

Amongst the *Insectivora* the muscle is inserted into the second and third metacarpals in *Erinaceus Gymnura* and the *Talpidæ*. In *Chrysochloris* it is attached to second metacarpal only.‖‖

Amongst *Rodentia* it is almost invariably split into long and short extensors, inserted as usual‖‖ and similarly in various *Carnivora*.

The *intermediate sector* of the superficial extensor stratum is represented by the *M. extensor communis digitorum* (figs. 9, 17, *e.c.d.* 1, and *e.c.d.* 2). This muscle is represented by two fleshy bellies united at their origins from the distal portion of the ectocondyle. Fibres of each head also arise from the septum between the two, and from the septa between their common origin and that of the extensor carpi radialis in front, and of the extensor carpi ulnaris behind. The two bellies become separate in the lower part of the forearm. Opposite the radio-carpal joint their tendons pass together through a strong and well-defined fibrous sheath to enter the dorsum of the manus. The more radial of the two tendons (*e.c.d.* 1) runs distally on the dorsal aspect of the metacarpal of the third digit, and is inserted into the ulnar of the two slight tubercles on the prominent dorsal projection of the base of the ungual phalanx of that digit, side by side with the tendinous slip from the M. extensor indicis et medii digiti (*vide* infra), which is inserted into the radial of the two tubercles. The second (ulnar) tendon of the extensor communis (*e.c.d.* 2) is slightly the stronger, and the transition from broad fleshy belly of this part of the muscle to narrow rounded tendon is a very abrupt one. It passes through the same fibrous sheath as the first-named tendon, and is inserted into the radial angle of

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* xxxviii., page 138. † xix., page 176. ‡ xxxix., page 387. § lxii., page 26. ‖ i., page 9. ¶ iii., *loc. cit.* ** xxvii., page 255. †† xxiv., page 38. ‡‡ xxvii., page 256. §§ xxi., page 306. ‖‖ xxvi., page 812.

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the very broad base of the ungual phalanx of the fourth digit, which is indeed fused with the base of the claw itself.

In accordance with the peculiarly modified manus in *Notoryctes*, this muscle exhibits a marked reduction from the ordinary marsupial type.

In Koala* Young describes an insertion into each of the five digits. This, Cunningham remarks,† is exceptional, as "in the great majority of marsupials its insertion is limited to the four inner digits."

[I do not think that Young's interpretation of the extensor group of muscles in Koala is a correct one. In several points it differs markedly from Macalister's brief account. I have dissected a young specimen in order to decide certain differences. I find that the extensor communis digitorum arises from the ectocondyle, and divides above the dorsal carpal ligament into three tendons, one for the medius, another for the medius and annularis, and a third, which is very broad in the dorsum of the hand, mainly for the minimus, but partly also for the annularis. The fibres of the last two tendons thus undergo a partial decussation. The first-named tendon (for the medius) passes through a separate theca. No tendon goes to either index or pollex, but the proper medial tendon is connected by a strong and somewhat rounded transverse vinculum with the indicator tendon.]

In *Thylacinus*, according to Cunningham, the muscle is trifid in the forearm, each tendon subsequently splitting, the six tendons being distributed to the four ulnar digits.

In *Echidna* Mivart‡ describes the muscle as bicipital, one head being ulnar in origin. He only notes tendons of insertion into the three middle digits, while Westling§ describes a tendon going to the terminal phalanx of each of the five digits.

In *Ornithorhynchus* the muscle is not bicipital, and arises only from the ectocondyle, its terminal tendon expanding on the back of the hand, and sending a slip to the distal phalanx of each of the five digits (Brooks||).

In *Chlamydophorus*¶ the muscle passes unbroken beneath the annular ligament, and then goes to be inserted into the second, third, and fourth digits.

The precise insertion varies in *Edentates;* in several cases it is into second, third, and fourth digits, as in *Chlamydophorus*, but it may be into second and third, third and fourth, or third only.

In *Erinaceus*, which is so very slightly specialised, it is inserted into each of the five digits.

In *Chrysochloris*** the insertion is into the third and fourth digits only. In this animal, it will be remembered, the manus is modified in somewhat similar manner as in *Notoryctes*.

No *M. extensor minimi digiti (extensor secundus digitorum auct.)* is present.

Such a muscle, designated by Macalister†† as "extensor secundus digitorum," is constantly present amongst other Marsupials, and is generally inserted into the fourth and "fifth" digits, rarely into the

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* lxxii., page 229. † iv., page 15. ‡ xxxix., page 387. § lxii., page 26, and fig. 14. || i., page 8. ¶ xxvii., page 256. ** xxvi., page 813. †† xxix., page 164.

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fifth only, and sometimes (*Sarcophilus*, Bennett's, and Giant Kangaroo*) into the third, fourth, and fifth digits.

In Koala I found the muscle with usual origin passing through a special theca, its tendon splitting into two, which pass on a deeper plane than extensor communis. The ulnar of the two tendons goes to minimus, the more radial is joined by a fibrous expansion from the tendon of the extensor medii proprius, and then passes to the annularis.

The muscle is present both in *Ornithorhynchus* and *Echidna*.†

For conflicting opinions regarding the homology of this muscle see infra (page 47).

The *ulnar sector* of the superficial stratum of the extensor mass is represented by the M. extensor carpi ulnaris. (Dr. Brooks holds that the M. anconeus quartus is likewise a part of this sector, but I have preferred to describe it along with the extensor mass of the brachium.)

M. extensor carpi ulnaris (figs. 9, 17. *e.c.u.*) ("ulnaris externus") arises by a narrow pointed origin from the lower part of the ectocondyle between the preceding muscle and the anconeus externus, with whose distal border it is in close apposition. Fibres of the muscle also arise from the intermuscular septa between it and adjacent muscles. It broadens out as it descends in the forearm, narrowing again towards the wrist into a moderately strong tendon. This passes beneath a fibrous arch, which binds it down to the back of the lower end of the ulna and ulno-carpal ligament, but immediately distal to this it turns abruptly inwards (*vide* fig. 17), winding almost under cover of the base of the great claw of the fourth digit to reach the dorsum of the diminutive fifth digit, to be inserted into the rudimentary metacarpal bone of the latter.

Among the Marsupials this muscle is sometimes split into two. Thus Cunningham found two distinct factors in *Phascogale* and in a specimen of *Thylacinus*,‡ while in *Dasyurus*§ MacCormick found two quite distinct tendons of insertion. In *Sarcophilus*|| Macalister also describes a second element which he identifies as *ulnaris quinti*, and which corresponds, according to MacCormick, to one of the tendons he found in *Dasyurus*.

The muscle is sometimes merely ectocondylar and fascial in origin (*Sarcophilus*, *Didelphys*, *Phalangista*, *Dasyurus*), but in others an ulnar origin is also present (*Phascolomys Macropus*, *Peramelis*, *Phascolarctos*)¶. In *Phascolarctos* I found it ectocondylar and fascial only, its tendon passing through a special theca behind lower end of ulna, and then winding round wrist to *palmar* aspect of fifth metacarpal, into which it is inserted close beside tendon of flexor carpi ulnaris, to which it is in this animal functionally accessory.

The usual insertion in this order is into the base of the fifth metacar-

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* xxix., page 164. † i., page 10, and fig. 6; lxii., page 27. ‡ iv., page 15. § xxxvi., page 126. || xxx., page 19. ¶ xxix., page 164; xxxvi., page 126; and lxxii., page 229.

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pal, *e.g.*, in *Phascolarctos*, *Phalangista maculata*, *Thylacine* (sometimes), *Phascolomys*, and *Myrmecobius*.* But where there are two tendons of insertion one may pass to the os hamatum, while the other goes to the fifth metacarpal, as in *Phascogale* and one specimen of *Thylacinus* (Cunningham), or as in *Dasyurus* and *Sarcophilus*,† both tendons pass to the metacarpal bone of the fifth digit.

In *Echidna* Mivart‡ notes the muscle as both ectocondylar and ulnar in origin, *i.e.*, from olecranon. Westling§ mentions also a fleshy origin from the ulnar shaft. The latter I have not been able to verify from dissections. Mivart merely gives as its insertion the outer side of the dorsum of the fifth digit, but Westling describes it as joining the extensor tendons of the fifth digit, and being inserted into the lateral borders of the middle and base of the terminal phalanx. Wenzel Gruber,‖ on the strength of Mivart's observations, holds that in *Echidna* the "ulnaris externus" is simply an "ulnaris digiti quinti."

In *Ornithorhynchus* Brooks¶ found the origin ectocondylar only, and that the tendon of insertion passed along with that of the extensor minimi digiti, and divided at the wrist into two. Of these one was inserted, as Westling found the tendon inserted in *Echidna*. The other, deeper, was joined by a slip from the abductor minimi digiti, and was then inserted into the base of the proximal phalanx of the little finger. Here also, therefore, as Brooks remarks, the muscle is converted into an ulnaris quinti digiti.

This description is remarkably different from that given by Coues,** who specially states that, while all other muscles lying on the forearm are more or less condylar in origin, this one "arises wholly from the ulna." Further, he states that it is inserted into the base of the fifth metacarpal, "partaking somewhat of the general tendency to aponeurotic expansion that characterises all the tendons coming down on the back of the hand."

Brooks' view is in agreement with Meckel's. The latter,†† in mentioning the muscles attached to the ectocondyle, and after noting the extensor communis digitorum, proceeds:—"Sequitur hunc latus et crassus, ulnaris externus, phalangi primæ digiti quinti insertus."

Coues has plainly taken for extensor (his "flexor") carpi ulnaris what Meckel and Brooks describe as "extensor indicis et pollicis," while he has taken the true extensor carpi ulnaris for extensor minimi digiti, apparently entirely overlooking the real extensor minimi, which lies more deeply. This author's description of the mode of ending of the extensor tendons is extremely vague and unsatisfactory. In particular, I cannot understand his statement that the tendon of *his* "flexor" ("extensor" of ordinary anatomists) carpi ulnaris is inserted into the fifth metacarpal. As a matter of fact, the tendon of the muscle in question does not pass at all near to the fifth metacarpal, but, as Brooks describes it, passes beneath the posterior annular ligament in the same compartment with the tendon of the extensor communis digitorum, and on the back of the hand distributes slips to the dorsal expansions

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* lxxii., page 229; iv., page 15; xxix., page 164; and xxvi., page 816.
† iv., page 15; xxxvi., page 126; and xxx., page 19. ‡ xxxix., page 387.
§ lxii., page 27. ‖ lx., page 24. ¶ i., page 9. ** iii., page 154. †† xxxvii., page 27.

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upon the pollex, index, and medius; hence Meckel's name for it of extensor pollicis et digiti indicis.

I have satisfied myself by dissection that the accounts given by Meckel and more fully by Dr. Brooks are correct descriptions, and there can be little doubt that the muscles are correctly named in their writings. It may be remarked that the quite superficial fleshy and aponeurotic origin from the ulna of the extensor pollicis et indicis reminds one of the origin of the human extensor carpi ulnaris. Here, however, the resemblance ends. It may also be noted that in *Echidna* the ulnar origin of the former muscle is not superficial, as it is in *Ornithorhynchus*, being overlapped by the olecranon fibres of the extensor carpi ulnaris, which lie close up to the posterior border of the ulnar shaft. Accordingly, there is a superficial resemblance between the ext. carpi ulnaris in *Echidna* and the extensor pollicis et indicis in *Ornithorhynchus*, so far as the relations of their fleshy bellies are concerned; but the homologue of the latter muscle in *Echidna* will be found beneath the former.

In *Chlamydophorus** the muscle is very weak, ectocondylar in origin, and inserted into metacarpal V.

In *Orycteropus*,† origin ectocondylar, insertion by two slips into metacarpals IV. and V.

In *Dasypus sexcinctus*,‡ ectocondylo-ulnar in origin, insertion V. metacarpal.

In *Bradypus gularis*§ two muscles are present; one ectocondylar inserted into metacarpal IV., the other, ectocondylo-ulnar (mainly ulnar) in origin, inserted into metacarpal V.

In *Cyclothurus*,§ also two muscles; one ectocondylar only, inserted into metacarpal III.; the other, ectocondylo-ulnar (mainly ectocondylar), inserted chiefly into metacarpal V., but sending a delicate slip to metacarpal IV.

In *Manis*,§ also two muscles; one, ectocondylo-ulnar in origin, is the smaller, and is inserted into the palmar surface of metacarpal V.; the other—more internal—arises from the ectocondyle, "between the preceding and the extensor communis, and divides a little above the wrist into two broad tendons; the outer and smaller of these is inserted into the outer side of metacarpal V., and the inner is continued along the outer side of digit IV. to the terminal phalanx." Humphry remarks in reference to this arrangement that the three elements just described in *Manis* correspond to the peronei in the hind limb, and he proceeds—"In the forelimb the three muscles are in several animals blended into one, the extensor carpi ulnaris. In others there are two—the extensor carpi ulnaris, constituting the homologue of the peroneus brevis and longus, and the extensor minimi digiti, which may pass to two or more digits, constituting the homologue of the peroneus tertius. All these, together with the extensor digitorum, belong to what I describe as the 'superficial layer.'"‖ Against this view St. John Brooks maintains that the extensor minimi digiti appertains not to the superficial stratum at all, but to the deep or extensor brevis stratum, such as is found in *Hatteria*. Upon this question *c.f.* Brooks' papers and discussion on his views.¶

* xxvii., page 257. † xv., page 583. ‡ xiv., page 543. § xxii., page 46. xxii., page 46. ¶ i., pp. 1 *et seq.*, and lxxii., pp. xv. and xix.

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M. supinator radii brevis (figs. 16 and 17, *s.r.b.*). (This muscle is systematised by Dr. Brooks* as a delaminated portion of the radial sector of the superficial extensor stratum.)

It takes origin from the lowest part of the ectocondyle by a narrow origin, and is inserted into the outer surface of the shaft of the radius as far distally as the insertion of the M. pronator radii teres, encroaching upon both dorsal and palmar aspects of the bone. The posterior interosseous nerve (N. radialis prof.) appears at its dorsal border between it and the extensor ossis metacarpi pollicis.

The muscle is relatively well developed in *Notoryctes*, occupying three-fifths of the shaft of the radius, and it is deeply placed under cover of the superficial extensor muscles.

Cunningham notes the muscle as feebly developed in the three Marsupial forms dissected by him,† but Macalister notes it as well developed in Koala‡, occupying two-fifths of the shaft of the radius, in Wombat as occupying two-thirds of the bone, in the Tasmanian devil, Wallaby and Giant Kangaroo one-third, and in the Opossum only the upper fourth.§

In *Dasyurus* it is limited to the upper fourth,‖ and MacCormick here notes an origin from the orbicular ligament of the radius. In no Marsupial has an ulnar region been described.

In *Echidna*¶ the muscle is purely condylar in origin, and has an extensive insertion into four-fifths of the radius.

In *Ornithorhynchus* it also possesses a condylar origin only, but its insertion is much less extensive, viz., into the upper third of the external border, and slightly into the anterior surface of the radius (Brooks**).

In *Chlamydophorus* the supinator brevis is poorly developed, and it is absent in *Tatusia*, but in several other Edentata it is large, *e.g.*, *Cyclothurus* and *Pholidotus*.††

It is absent in the *Talpidæ*‡‡ amongst the *Insectivora*, but present in the *Erinaceidæ*.§§ It is present also in *Rodentia*|||| and *Carnivora*.

The deep stratum of the extensor muscle of the antibrachium is represented in *Notoryctes* by two muscles. The first is *M. extensor ossis metacarpi pollicis* (figs. 9-12 and 17 *e.m.p.*). This is a broad muscle arising from both bones of the forearm between the supinator brevis on the radial, and the extensor indicis on the ulnar side, and extending as far proximally as the lower border of the anconeus externus, or even beneath it. At the wrist the muscle narrows and gives place to a fine tendon, which escapes obliquely from under cover of the common extensor of the digits, and, crossing the tendon of the extensor carpi radialis, it winds round the summit of the radial styloid and passes

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* i., page 1. † iv., page 16. ‡ xxviii, page 130. § xxix., page 165, ‖ xxxvi., page 128. ¶ xxxix., page 387. ** i., page 9. †† xxvii., page 255. ‡‡ xxvi., page 811. §§ viii., page 395. |||| xl., page 400.

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further obliquely on to the apparent palmar (but still morphologically dorsal) aspect of the carpus to reach the base of the metacarpal bone of the pollex, into which alone it is inserted.

In Cuscus Cunningham found this muscle partly subdivided, one slip being inserted into the trapezium. He regards this as corresponding to the separation in the human subject of an extensor primi internodii pollicis. In *Thylacinus* the subdivision was complete, while the condition in *Phascogale* resembled that in Cuscus.* A like condition is noted both by Young† in Koala, and by Macalister also in that animal, as well as in the Wombat and Tasmanian devil and others.‡ The characters of the muscle in Koala are rather striking. It has the usual radio-ulno-interosseous origin. Halfway along the forearm its radial border developes a tendon which almost immediately separates from the rest of the muscle. This tendon is of even width and much slenderer than the broad flat tendon of the rest of the muscle, which begins just above the wrist. Both tendons pass through a special fibrous theca at the wrist, crossing the supinator longus and radial extensors of the carpus. The long slender tendon is inserted into the radial border of the metacarpal of the pollex, and lies close to but unconnected with the abductor brevis pollicis. The thick, strong tendon of the rest of the muscle is inserted into the trapezium.

Extensor profundus in *Petaurista taguanoides*§ consists of extensor secundi internodii pollicis and extensor medii digiti, the latter connected also with the second and fourth digits.

In *Dasyurus*|| MacCormick found only the pollicial attachment. So also Sidebotham in *Chironectes*.¶ In *Myrmecobius* it is attached only to the trapezium.**

According to Carlsson (quoted by Leche),** the insertion in *Didelphys* is into the first metacarpal and into the "præpollex."

In *Echidna*†† Mivart describes it as a delicate muscle, interosseo-ulnar in origin, pollicial only in insertion. It is closely associated with the common extensor, according to Westling.‡‡

Brooks found practically the same condition in *Ornithorhynchus*.§§

In *Chlamydophorus* the muscle is very large, ulnar in origin, and inserted into the metacarpal of the pollex. It is very much the same in *Tatusia* and *Dasypus*, but in *Cyclothurus* it is "humeral in origin, and is inserted into the ossicle, which is the rudiment of the first metacarpal, or "of trapezium and others," according to Humphry. In *Orycteropus* it is inserted into the trapezium only, and into this bone and partly into the first metacarpal in *Myrmecophaga*.|||

Dobson does not mention the muscle in *Gymnura*,¶¶ and according to Leche it occurs in all except this Insectivore.

Leche quotes from Carlsson to the effect that in *Castor* and *Rhizomys* besides the usual insertion (into the pollicial metacarpal) there is a tendinous slip to the praepollex, and in *Cercolabes* the latter is the only insertion.***

M. extensor indicis et medii digiti proprius (figs. 9, 11, 12, and

* iv., page 15. † lxxii., page 229. ‡ xxviii., page 431, and xxix., page 164. § xix., page 176. || xxxvi., page 126. ¶ liii., page 10. ** xxvi., page 817. †† xxxix., page 387. ‡‡ lxii., page 28. §§ i., page 9. |||| xxvii., page 258, and xxii., page 48. ¶¶ viii. *** xxvi., page 818.

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17, *e.i.m.*). This second deep extensor arises from the posterior aspect of the shaft of the ulna by a narrow, pointed, fleshy belly, which extends upwards on the bone as far as the base of the olecranon, from which its highest fibres arise. The muscle covers the attachment to the shaft of the ulna of the anconeus externus, and in the distal part of the forearm it is directed obliquely towards the radius under cover of the extensor carpi ulnaris, so as to enter the same fibrous compartment of the dorsal annular ligament which transmits the tendons of the extensor communis digitorum. Still running obliquely its tendon passes beneath the tendons of the latter muscle, and comes to lie by their radial side. It then divides into two slips, the stronger of which passes to the dorsum of the index, where it is inserted, partly by lateral expansions into the base of the proximal phalanx and partly by a direct prolongation of itself into the base of the ungual phalanx. The other (weaker) division of the tendon is inserted into the radial of two slight tubercles on the prominent dorsal projection of the base of the ungual phalanx of the third digit.

M. extensor secundi internodi pollicis (extensor pollicis longus) is unrepresented, or rather the above muscle is the sole representative of the muscular mass from which the extensor secundi is typically differentiated.

In *Thylacinus* and *Phascogale*, according to Cunningham, there is a single muscular mass sending tendons to pollex, index and medius, which he designates as extensor secundi internodii pollicis. It is of course the equivalent of the muscle now under consideration, with the addition of a pollicial division.

In *Cuscus* the author just mentioned found the same mass represented by two distinct muscular factors connected respectively with pollex and medius.

The origin of the compound muscle in *Thylacinus* and *Phascogale* resembles that in *Notoryctes*. There "it springs from the radial side of the olecranon and from the upper third of the posterior border of the ulna."*

Macalister† describes an extensor secundi internodii pollicis arranged "as usual" in Koala, but Young‡ could find so such muscle in that animal, nor did he find any such indicator muscle as Macalister also describes "giving a filmy slip to the pollex." Young expressly says that "the thumb has no special extensor of the phalanges beyond the slip derived from the common extensor."

Both authors describe an extensor secundus digitorum supplying the fourth and fifth digits, and the extensor medii digiti was conjoined with this in Young's dissections, but separate in Macalister's. The slips to the fourth and fifth digits Young holds to represent the extensor minimi digiti. It arises from the shaft of the ulna along with the extensor medii digiti (*cf.* page 44).

I am strongly of opinion Young has described, as part of the ex-

* iv., page 16. † xxviii., page 131. ‡ lxxii., page 229.

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tensor communis, those muscular elements which Macalister has rightly recorded under the names of *extensor secundi internodii pollicis* and *indicator* respectively.

As has already been mentioned (p. 44), Young states that the common extensor is inserted into all five digits, an arrangement which Cunningham has pronounced to be unusual amongst marsupials. Macalister, on the other hand, passes over the common extensor in Koala as arranged "as usual." And when we look at Young's description in detail, we note that he found the two radial tendons of his common extensor passing beneath the annular ligament in a separate compartment from the others, and going to the pollex and index. Are these not in all probability Macalister's extensor secundi and indicator together? This explanation would largely harmonise the discrepancies between the statements of these two observers.

I have verified by careful dissection the accuracy of Macalister's description. I find that an extensor pollicis longus (secundi internodii) is undoubtedly present. It is separable from the rest of the deep extensor stratum, except high up at its origin from the olecranon, where it is only partially separable from the fibres of the indicator muscle. The latter arises from the proximal part of the ulnar shaft and the aponeurosis covering it. Distal to this again, and separated from it by a small bare area of the ulnar shaft, is the origin of the extensor medii digiti proprius. Extensor pollicis longus passes through a special theca, and opposite the metacarpal its long and strong tendon is connected by a broad, flat, tendinous vinculum with the indicator tendon. It passes to the usual insertion. The tendons of the indicator and of the proper extensor of the middle finger pass through a common fibrous compartment beneath the dorsal carpal ligament.

In his Monograph on the extensor indicis proprius, &c., Wenzel Gruber* states that in a specimen of *Phascolarctos cinereus* he found an extensor pollicis longus (secundi internodii pollicis), an extensor indicis proprius, and an extensor digiti medii proprius. The first-named had a special sheath in the dorsal carpal ligament, while the other two passed beneath that ligament in a common sheath, with that tendon of the common extensor of the digits going to the index. The arrangement here described is very similar to that I have just noted in Koala. But in my specimen there was no tendon of the common extensor going to the index at all, hence the indicator and extensor medii tendons were alone in their theca.

In *Dasyurus*† MacCormick found a small and fusiform extensor secundi internodii pollicis arising from the radial side of the olecranon and overlapping the lower part of the insertion of the anconeus externus, and thus corresponding in part to the origin of the extensor indicis et medii digiti in *Notoryctes*. He also found a muscular mass in series with the extensor secundi, and arising from the posterior surface of the ulnar shaft. It accompanied the extensor secundi under cover of the extensor communis, and divided into slips for the second, third, and fourth digits. It was very variable in size and connections. Sometimes the slip to the fourth digit was absent, and sometimes the indicial part was a distinct muscle.

* lxi., page 46. † xxxvi., pages 127-8.

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In *Sarcophilus** Macalister describes an "extensor indicis" giving slips to second, third, and fourth digits, in addition to an extensor secundi internodii pollicis, as in *Dasyurus*. The author views this series of slips as forming a third group of extensors of the digits. His second group, or extensor secundus digitorum, is constituted by the homologue of the human extensor minimi digiti, which in *Sarcophilus* arises with the extensor communis, and supplies tendons to the third, fourth and fifth digits.†

In Wombat,* extensor pollicis longus is present, but the extensor indicis is absent, and the extensor secundus digitorum supplies only the fourth and fifth digits.

It is at least difficult to reconcile this overlapping of the series of slips from Macalister's extensores secundus and tertius respectively, with Brooks's view‡ that the extensor minimi digiti is simply a displaced element of the extensor brevis series of slips which form originally an *extensor profundus* in the forearm.

In *Chironectes*§ an extensor secundi internodii pollicis is present, giving slips to both pollex and index, and a like condition obtains in *Myrmecobius*||.

In *Ornithorhynchus* Dr. Brooks, following Meckel,¶ has described an "extensor indicis et pollicis," giving tendons to pollex, index, and medius. It is large, ulnar in origin (extending up to and upon olecranon), and it is subcutaneous for a large part of its extent. This muscle is plainly the one noted by Coues** under the name of "flexor" (extensor) carpi ulnaris, though the insertion given by him is inexplicable to me. I have already alluded (p. 46) to the confusion introduced by Coues' unfortunate statements. I have made dissections which fully corroborate Dr. Brooks' description in almost every detail. Coues' description of this region must, therefore, be put aside as erroneous.

In *Echidna* neither Mivart†† nor Westling‡‡ has described any deep extensor, save the extensor ossis metacarpi pollicis. Indeed, Mivart expressly states that neither extensor secundi internodii pollicis nor extensor indicis are present. I have already (p. 47) referred to the presence of such a muscle in dissections I have made of the forearm of *Echidna*. It is quite a large muscle, arising from the proximal half of the dorsal aspect of the shaft of the ulna and from the base of the olecranon. Its origin upon the shaft of the ulna is parallel with that of the extensor ossis metacarpi, which indeed is slightly overlapped by it. It is largely covered at its origin by the origin of the extensor carpi ulnaris, and under cover of this the upper pointed end of its origin touches the insertion of the anconeus externus. Below, the muscle passes beneath the extensor communis, which position it occupies for the rest of its course, hence in Westling's figure it does not come into view. On the dorsum of the hand its tendon flattens out beneath the expansion of the common tendon which it joins, but fibres of it may be traced to all the four outer digits.

Thus the condition in *Echidna* is essentially the same as that in *Ornithorhynchus*. It is probable that the muscle just described is represented in Westling's account by the deep head of the extensor communis

* xxix., page 164. † Cf., also iv., page 17. ‡ i., page 14. § liii., page 10. || xxvi., page 818. ¶ i., page 10, and fig. 6; lxii., page 27. ** iii., page 154. †† xxxix. ‡‡ lxii.

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digitorum of that author. I found the tendons separable from those of the extensor communis as above stated, hence I take it to be a true deep extensor muscle.

The condition of the corresponding muscle in *Chlamydophorus* is thus described by Macalister* :—" Extensor indicis (' quamvis etiam ad pollicis fasciolam fibrosam ablegaret, quae sola pollicis extensioni sufficere debet') arises high up from the ulna as high as the olecranon; it is very large, larger than its neighbour the extensor ossis metacarpi pollicis. I found its main tendon passing as usual to the dorsum of the index, but a broad slip of fascia stretches along the dorsum of the thumb to the last phalanx, justifying the words of Prof. Hyrtl before quoted."

In *Tatusia* the same author found it also exceedingly large and strong, and here it ended in two tendons inserted into the index and medius. So also in *Orycteropus*.†

In *Dasypus*‡ the tendons are inserted into the index and pollex. In *Bradypus (didact* and *tridact)*§ the insertion is into the index alone, and in *Manis (Philodotus*, Macalister) *Dalmanni)*§ into the terminal phalanges of each of the first three digits.

In *Manis multiscutatus* Macalister|| found no long extensor indicis, but the extensor brevis digitorum on the back of the carpus was indicial in its insertion. He found the muscle ulnar in origin and pollicio-indicial in insertion in *Myrmecophaga*.

In *Edentata* separate and distinct extensors of the thumbs are rarely present, if we exclude the extensor ossis metacarpi as an abductor longus. Macalister notes the extensor pollicis longus (secondi intermedii) as a very small muscle in *Myrmecophaga* and *Manis*.¶

Among the *Rodentia* the extensor indicis is present in many forms, amongst others in *Hystrix, Arctomys, Castor*,** *Cavia, Lepus*, and *Dasyprocta*.†† Of these it sends a tendon also the pollex in *Lepus*†† and *Castor* (usually)**, so that the muscle represents the extensor secundi internodii pollicis as well. In *Dasyprocta* and others the extensors of the thumb are absent.

In *Capromys*‡‡ a special extensor secundi internodii pollicis is present along with the extensor indicis.

In *Chrysochloris* among the Insectivora Dobson found extensor indicis as a single muscle, so also frequently in *Erinaceus*.§§

For further details of the morphology of this muscle *cf.* Gruber's monograph.||||

Muscles of flexor aspect of forearm are four in number.

M. pronator radii teres (figs. 6, 7, 10, 11, 12, and 16, *p.r.t.*) is a muscle of considerable size, and forms the preaxial member of the group of muscles arising from the entocondyle. From its origin onwards it lies partly under cover of the flexor carpi radialis, but a strip of it is superficial. Its origin is partly

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* xxvii., page 258. † xv., page 581. ‡ xiv., page 542. § xxii., page 49. and Pl. 252, fig. 1. || xxxv., page 506; Cf. also, xvi., page 252. ¶ xxxv., page 506. ** xxxviii., page 551. †† xl., page 405. ‡‡ Dobson quoted by Leche, xxvi., page 819. §§ lxi., page 45. |||| lxi.

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fleshy and partly tendinous from the entocondyle, and its fibres pass distally to be inserted into the shaft of the radius on the palmar aspect of its distal fourth. It overlaps the insertion of the biceps, and the large median nerve passes under cover of it.

The *M. pronator quadratus* is entirely absent.

I am not aware of any other Marsupial in which the pronator quadratus is absent, and in many it occupies the whole length of the interosseous space,* *e.g.*, in Wallaby and *Perameles*.

The coronoid head of the pronator radii teres is never present in any Marsupial, and its general characters in the order are very constant, varying chiefly in size and extent of insertion into radius. In some cases (Cuscus†) it is inserted into the distal half of the shaft, in others (*Thylacinus* and *Dasyurus*†) into the middle third or so of the radius, and in *Macropus*‡ into the upper third.

Both in *Ornithorhynchus* and *Echidna* the pronator teres is very strongly developed, is entocondylar in origin, and is inserted into the radial shaft as low as the wrist.

There is no trace of a pronator quadratus in the *Monotremata*.

Amongst *Edentata* the condition of the pronator quadratus is very variable.

In *Chlamydophorus*§ Macalister found the pronator quadratus represented by a fibrous band, whilst Hyrtl found no trace of it.

It is rudimentary in *Tatusia*, absent in *Pholidotus* and *Dasypus*,‖ while in *Orycteropus*¶ Galton found it occupying the whole interosseous space, though Humphry found it small. Galton found it in *Cyclothurus*** as in *Orycteropus*.

Macalister notes it as absent in *Manis*, and as reaching the whole length of the forearm in *Myrmecophaga*††.

The pronator teres in *Edentata* is always inserted into the distal part of the radial shaft for an extent varying from one-third (*Chlamydophorus*) to two-thirds (*Manis*). The coronoid head is invariably absent.**

Macalister's paper‡‡ on the Pronator muscles in Vertebrates may be further consulted on the morphology of these muscles.

M. flexor carpi ulnaris (figs. 6, 7, 9, 12, 13, 14, and 15 *f.c.u.*). This muscle arises by two very distinct heads—one from the olecranon, the other from the entocondyle. Just above the wrist these bellies unite to form a strong tendon, which is first developed upon the superficial aspect of the muscle, and is united with the overlying aponeurosis of the tendon of insertion of the latissimus dorsi. The tendon is inserted into the elongated pisiform bone near to its base (figs. 14 and 15).

At their origin the two heads of the muscle are in relation with the distal border of the M. anconeus internus, and together

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* xxxiii., page 337. † iv., page 17, and xxxvi., page 130. ‡ xxix., page 162. § xxvii., page 253, and xxiv., page 39. ‖ xxvii., page 253, and xiv., page 546. ¶ xv., page 586. ** xvi., page 253. †† xxxv., page 504. ‡‡ xxxiii., page 335.

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with it they limit a small triangular interval, at the bottom of which the ulnar nerve may be found.

The muscle is relatively a very powerful one. As has already been mentioned, it is covered by a strong aponeurosis, which forms the continuation of the tendon of insertion of the M. latissimus dorsi.

The arrangement of this muscle in *Notoryctes* is practically identical with that found by Cunningham in *Thylacinus* and *Phascogale*,* and is fairly typical of marsupials generally. In the three forms examined by the last-named author the insertion was into the pisiform in each case; so also is the case in *Sarcophilus*† and *Dasyurus*.‡ In *Phascolomys*† it is inserted into the fifth metacarpal, and in *Phascolarctos*§ into both the above-mentioned bones as well as into the os hamatum. In *Chironectes* into pisiform and fifth metacarpal.‖

In *Macropus*† the condylar origin is lacking.

In *Echidna* the muscle is "enormously wide" (Mivart¶), arising not only from entocondyle and olecranon, but also from the inner border of the ulnar shaft as far as the wrist. Mivart states that its tendinous surface "receives the tendon of the first part of the latissimus dorsi; and the two muscles becoming thus ultimately united, are together inserted into the pisiform bone." Westling, however, distinguishes this "first part of latissimus" from the rest as a "*dorso-antebrachialis*,"** the latissimus dorsi itself being arrested at the entocondyle. As I have indicated above (p. 16), this "dorso-antebrachialis" is inseparable from the latissimus in *Notoryctes*, and indeed forms the only insertion of the muscle, *cf.* also Coues' description in *Ornithorhynchus*.††

The flexor carpi ulnaris in *Ornithorhynchus* resembles that in *Echidna*. The fibres of its strong tendon are completely arrested at the pisiform bone; it is only quite indirectly that it has an attachment to the bases of the fourth and fifth metacarpals, as Meckel describes it;‡‡ hence Leche is mistaken in classifying its insertion with others as deviating from the typical mode.§§

Amongst the *Edentata* the muscle varies considerably in different forms, from a slender separate muscle with two scarcely separate heads, inserted into pisiform in *Chlamydophorus*, to an enormous mass of four segments, condylo-pisiform, posterior ulno-pisiform, anterior ulna-pisiform, and olecrano-pisiform in *Cyclothurus*.

No special features require note in the other orders reviewed.

M. flexor carpi radialis (figs. 6, 7, 11, 12, 14, 15). This muscle arises from the entocondyle close to the entocondylar head of origin of the M. flexor carpi ulnaris.

It forms a broad fleshy belly on the flexor aspect of the forearm, which suddenly narrows a little above the wrist and forms a rounded tendon, which passes through a canal in the "scapho-carpal" (fig. 10, *for.f.c.r.*). In this bony canal the tendon divides

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* iv., page 18. † xxix., page 163. ‡ xxxvi., page 131. § lxxii., page 230. ‖ liii., page 9. ¶ xxxix., page 388. ** lxii., page 23, and Taf. iv., fig. 12. †† iii., page 147. ‡‡ xxxvii., page 28. §§ xxvi., page 827.

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into two. Entering the palm these are inserted one into the base of the metacarpal of the pollex, and the other into the base of the metacarpal of the index (fig. 15).

Considerable variety prevails among Marsupials with respect to the mode of insertion of this muscle. Thus in *Thylacinus** it is inserted partly into the trapezium and partly into the metacarpal of the pollex; in *Phascogale** into the trapezium alone; in Cuscus* the tendon splits, and the slips are inserted into the palmar aspects of the bases of the metacarpals of the index and medius respectively. In *Dasyurus*† its tendon occupies a special compartment in the outer part of the anterior annular ligament, and is inserted partly into the palmar aspect of the trapezium and partly into the bases of the second and third metacarpal bones. In *Chironectes*‡ it is inserted into the radial side of the base of the metacarpal of the medius only, and in *Phascolarctos*§ also the insertion is so limited. In *Phascolomys*, *Phalangista*, *Didelphys*, and *Perameles* the muscle passes from the entocondyle to the third metacarpal,|| but in *Sarcophilus*|| a slip in addition is attached to the trapezium. In *Myrmecobius*¶ it is attached to the carpus only (scaphoid trapezium and lig. carpi volare). It is inserted into the bases of the second and third metacarpals in *Petaurista*.**

In *Ornithorhynchus* the muscle is relatively very large, and is deep palmo-dorsally; the pronator radii teres lies embedded in its ulno-palmar aspect. Its origin is from the entocondyle at its tip, but extending deeply on its distal aspect to the very edge of the humero-radial articulation. Part of the muscle arises from the neck of the radius.

Just above the carpus the broad fleshy belly narrows with great abruptness, and a single rounded tendon results which is wholly inserted into the radial sesamoid bone, and has no connection except by means of carpal ligaments with the metacarpal bones. This radial sesamoid is situated on the palmar aspect of the radio-carpal joint and scapho-lunar bone, and is united to the latter by ligament.

In *Echidna* the muscle is not relatively quite as large as in *Ornithorhynchus*, but it has substantially the same origin and relations in the forearm (I could not make certain that any of its fibres actually took origin from the radius in the specimen I examined for this purpose).

In the lower part of the forearm it does not contract in width so markedly as does the corresponding muscle in *Ornithorhynchus*, but a stout tendon (derived from the tendinous investment of the muscles) appears along its palmar border. The deeper part of the muscle is continued, partly fleshy and partly tendinous, into the carpus. Here it encounters the radial sesamoid bone into which it is inserted, and this bone is in turn connected by strong ligamentous fibres with the large scapho-lunar bone in front of which it is placed. The more superficial tendon of the palmar border of the muscle as it enters the hand flattens out and passes in front of the sesamoid. Westling says it is connected with the first and second metacarpals. I find, however, that such a connection is at most quite indirect through the palmar carpo-metacarpal ligaments with which the tendinous fibres are connected.

* iv., page 17. † xxxvi., page 130. ‡ liii., page 9. § lxxii., page 230. xxix., page 162. ¶ xxvi., page 822. ** xix., page 176.

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The chief part of the tendon is really inserted into the trapezium and the scapho-lunar, distal to the radial sesamoid.

The descriptions just given differ somewhat from those given by other observers,* though on the whole I can corroborate the account given by Westling of the arrangement of the muscle in *Echidna*.

The radial sesamoid in *Ornithorhynchus* is very firmly attached to the palmar aspect of the scapho-lunar, but I could find no indication whatever of any special continuation of the tendon of the flexor carpi radialis to the base of the second metacarpal, such as is alleged to exist in Meckel's descriptions.†

In *Chlamydophorus*, *Cyclothurus*, and *Tatusia*‡ this muscle is small, and is inserted into the metacarpal of the pollex only; into third, second, and first metacarpals in *Pholidotus*;‡ into the index metacarpal, with the intervention of a radial sesamoid bone, in *Orycteropus*,§ and into the carpus only in *Dasypus* (os multangulum)‖ and *Choloepus* (scaphoid and os multangulum).‡

In *Dasyprocta* (and in Hare, Rabbit, and Guineapig)¶ the muscle is entocondylar in origin, but is inserted into the base of the first phalanx of the index. But in rodents in general Meckel speaks of it as arranged as usual,** and Leche gives the index metacarpal as the insertion in the Rabbit.††

Amongst the *Insectivora* it arises in *Chrysochloris*, not only from the entocondyle, but from the proximal third of the ossified tendon of the flexor profundus digitorum. It is then inserted into the index metacarpal, as also in *Erinaceus*.‡‡

Amongst *Carnivora* the muscle is inserted usually into the index metacarpal, but may be also into the first or third, *e.g.*, dog.

As already stated, there is no *M. palmaris longus* present in Notoryctes, and the *M. flexor sublimis digitorum* being also absent, there is only one long digital flexor present forming the representative of the M. flexor profundus digitorum (+ flexor longus pollicis) of other forms.

M. flexor digitorum (figs. 12-15 *f.dig.*) consists of a muscular mass imperfectly segmented into four portions.

Following Windle's classification§§ of the constituents of the deep flexor mass, we may here distinguish representatives of (a) *condylo-ulnaris*, (b) *condylo-radialis*, (c) *ulnaris proprius*, (d) *radialis proprius*. I found no trace of a *centralis* element.

All the parts of the muscle are attached to the large palmar sesamoid bone (figs 13-15 *p.ses.*). See also Stirling's description.‖‖

From the distal portion of this bone the tendons of insertion proceed.

Condylo-ulnaris and *condylo-radialis* (*f.dig. 1 and 2* in figures) arise side by side from the slight pit-like depression on the distal

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* xxxvii., page 27; iii., page 152; xxxix., page 388; and lxii., page 25.
† xxxvii., page 27, and xxxviii., page 543. ‡ xxvii., page 250. § xv., page 584. ‖ xiv., page 544. ¶ xl., page 400. ** xxxvii., page 544. †† xxvi., page 821. ‡‡ xxvi.. page 822. §§ lxviii., page 73. ‖‖ liv., page 177, and Pl. viii., fig. 5.

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aspect of the entocondyle. They are partially distinct as far as the sesamoid bone, into which they are inserted, partly fleshy, partly tendinous, rather in front of the other two portions.

Ulnaris proprius (*f. dig.* 3 in figures) arises from the whole of the hollow inner surface of the large olecranon and from the inner surface of the proximal half of the ulnar shaft. It is partly overlapped by the condylar heads of the muscle, and largely by that of the flexor carpi ulnaris. It is inserted into the proximal end of the palmar sesamoid by a stout rounded tendon, side by side with, and on the ulnar side of, the insertions of the condylar heads, though slightly on a deeper plane. The tendon of insertion is continued up in the substance of the muscle; and into the superficial aspect of the tendon, in the upper part of the forearm, are inserted many short fleshy fibres, which arise from the intermuscular septum between the muscle and the overlying flexor carpi ulnaris.

The remaining portion—*radialis proprius* (*f. dig.* 4 in figures)—is deepest of all. It takes origin by fleshy fibres from the shaft of the radius, extending up as far as the insertion of the biceps, and downwards as far as the lower end of the radius. It is inserted into the deeper aspect of the proximal end of the palmar sesamoid, close to its radial corner.

The distal extremity of the palmar sesamoid gives origin to two short, very thick, and rounded tendons; and a third, more slender, tendon arises from the radial border of the bone, close to its distal end. The latter passes on to the palmar aspect of the second digit, and courses distally in front of its proximal phalanx, to whose palmar surface it is secured by a fibrous ring. It then passes on to be inserted into the palmar aspect of the base of the terminal phalanx.

The other two thicker tendons are inserted into the palmar aspects of the strong ungual phalanges of the third and fourth digits respectively.

A tendinous vinculum connects the medial with the indicial tendon (fig. 15, *vi.*).

Lumbrical slips are entirely absent.

Windle* has shown that where the flexor profundus attains a relatively great development, the flexor sublimis is proportionately reduced, and this he states to be the case in many of the *Carnivora*, and some of the *Marsupialia*.

Such a condition is typically illustrated in the case of *Dasyurus*, where flexor sublimis was found by MacCormick† to consist of a slender tendon lying in a shallow groove in front of the great flexor tendon, and arising from the front of the upper part of the latter. This author describes the great deep flexor mass in four parts, the first

* lxviii., page 73. † xxxvi., page 132.

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of which he takes to be equivalent to the origin of the flexor sublimis; but this is independent of the muscle he describes, as above quoted, and is, in fact, plainly identical with Windle's condylar portions. MacCormick's fourth division of the deep flexor is evidently a typical *centralis* element.

Palmaris longus is well developed in *Dasyurus*. An essentially similar condition obtains in *Phascolarctos*,* *Chironectes*,† and *Myrmecobius*.‡

In Cuscus§ Cunningham found the flexor sublimis arising by four minute fleshy slips from the surface of the deep flexor mass, but he regarded as the real equivalent of the origin of the flexor sublimis what Windle has since taught us to regard as condylo-ulnaris and -radialis portions of the deep flexor. Practically the same arrangement was found in *Thylacinus* and *Phascogale*.§ So also in *Phascolomys* and *Sarcophilus*,|| according to Macalister, who also accepts the condylar origin as a sublimis, inseparable from profundus, and explains the arrangement as practically a digastric condition of the sublimis.

I find no case recorded in the literature of marsupial myology in which the flexor sublimis or palmaris longus are entirely absent.

Westling¶ and Leche‡ both state (authority not given) that in *Macropus* (as in *Echidna*) no distinct flexor sublimis is present, but Macalister states|| that in the Wallaby the sublimis "arises from the inner condyle inseparably united to the profundus; but from the tendon of the common flexor above the wrist the fleshy fibres of the sublimis arise and form a lower belly, which sends tendons to all the fingers but the first." Hence the condition in certain species of *Macropus*, at least, is similar to the ordinary marsupial one.

Flexor digitorum gives tendons to all five digits in marsupials generally. Flexor sublimis usually goes to the four ulnar digits, but in *Myrmecobius*‡ and *Chironectes*† the tendon for the fifth digit is lacking.

I find no record of the existence in any other marsupial of a palmar sesamoid, such as is found in *Notoryctes*. The nearest approach to such a condition is recorded by MacCormick in *Dasyurus*. In that animal there is just above the wrist "an exceedingly strong tendinous mass, which, on its deep surface, is covered by a pad of fibro-cartilage, . . ."**

In *Echidna* there is a single large flexor mass, a small partially separable superficial portion of which Mivart surmised might represent the palmaris longus. He also took the condylar part of the mass to represent the flexor sublimis element.†† Westling‡‡ does not refer to any subdivision of the mass.

At the wrist an exceedingly strong tendon is developed, and in this is a sesamoid bone (one or two, Mivart). Below this the tendon splits into five tendons inserted into the terminal phalanges by each of the digits.

In *Ornithorhynchus*, too, there is only one flexor mass in the forearm, with a similar arrangement as regards the digits. Coues found

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* lxxii., page 231. † liii., page 9. ‡ xxvi., page 823. § iv., page 18. || xxix., page 163. ¶ lxii., page 24. ** xxxvi., page 132. †† xxxix., page 388. ‡‡ lxii., page 23.

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"several small irregular gritty specks like imperfect sesamoids" in the tendon at the wrist* (*cf.* also Meckel†).

In this animal, however, Coues found a small fusiform belly embedded in the substance of the muscle, and ending in a fine tendon, which was traced distinctly to the wrist, and then lost.‡ This he took to be palmaris longus. He also found in the palm a small muscle, or rather four small muscles, arising from the palmar aspect of the tendon of the deep flexor. The fine tendons of these slips he found partly to join those of the deep flexor, and partly to be arranged like those of a flexor sublimis, to which accordingly he homologises it.

Meckel refers to the last, but does not name it; and he states that the four small tendons are inserted, not into bone, but into the interdigital membrane.§ I think Coues' view of the homology is probably correct, and if so the condition in *Ornithorhynchus* falls well in line with that described, *e.g.*, in Cuscus, by Cunningham (*supra* p. 172), where the flexor sublimis was reduced to four small fleshy slips arising in the forearm from the surface of the deep flexor mass. There is, however, another possible view of the palmar fleshy slips in *Ornithorhynchus*, viz., that they represent a palmaris longus. The superficial position of the slips, and the somewhat indefinite ending of their tendons in sheathing the digital flexor tendons is at least equally explicable upon such an hypothesis. There is certainly no other representative of the palmaris longus present.

I have traced the small fusiform muscle which Coues found embedded in the flexor mass in *Ornithorhynchus*. Its fine tendon, surrounded by the musculo-tendinous fibres of the rest of the muscle, is attached to one of the sesamoid bones in the common tendon. It undoubtedly corresponds, not to the palmaris longus, as Coues thought, but to the "centralis" flexor element of Windle.‖ It is indeed a fairly typical example of this factor of the flexor mass.

Both in *Echidna* and *Ornithorhynchus* the great flexor muscle is ulnar and entocondylar in origin.

In *Chlamydophorus* there is a palmar sesamoid ossicle, and to it three muscles are attached, according to Macalister.¶ The first he regards as flexor sublimis, and is the only condylar part of the flexor mass. It as attached to the ulnar side of the palmar sesamoid. I should think it highly probable that this in reality is only the condylar portion of the deep flexor, or at least of an only partially differentiated flexor mass. There are, at any rate, no insertion slips which correspond to those of a flexor sublimis. The other sectors of the flexor mass attached to the palmar ossicle are an ulnaris (Macalister's flexor profundus) and a radialis (flexor longus pollicis). The three sectors seem to be quite separable in the forearm. From the distal end of the ovate ossicle five tendons proceed, including an exceedingly fine one to the pollex.

But Macalister describes in addition** seven fine fleshy bundles arising from the sesamoid bone, which are inserted *into each side of the second phalanges* of the fingers except the thumb, and the ulnar side of the minimus, "forming short flexors." These slips at once remind one of the very similar slips in *Ornithorhynchus*, and, as in that animal,

* iii., page 154. † xxxvii., page 28. ‡ iii., page 155. § xxxvii., page 28, and xxxviii., page 559. ‖ lxviii., page 74. ¶ xxvii., page 251. ** xxvii., page 252.

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are at least highly suggestive of true flexor sublimis elements, here again shrunk down into the palm. Such a reduction, complete or partial, is, in fact, found in other well-known forms, as in *Hatteria*;* and amongst the Mammalia in *Viverra civetta*,† where that part of the flexor sublimis, at least, which is inserted into the fifth digit, arises not with the rest of the superficial flexor fibres in the forearm, but from the annular ligt. and pisiform. The tendon to the fourth digit, too, in this animal receives an accessory short slip which joins the proper flexor perforatus tendon. Finally, in the *Jerboa*,‡ according to Humphry, "the flexor sublimis passes to the three middle digits only, the other digits (I. and V.) receiving delicate muscular superficial flexors from the supernumerary carpal ossicle which is present in that animal."

Further, in *Chlamydophorus* there is a large, thin superficial palmaris longus§ condylar in origin and fleshy to the wrist nearly. "Its tendon expands over the palmar ossicle, and ends in four superficial slips lost in sheathing the tendons over the digits." Hyrtl was doubtful whether the latter insertion was not that of a flexor sublimis. Macalister's rejection of this tentative view is doubtless right, but I am inclined to believe that his "sublimis" is only part of the deep flexor mass, and that the true sublimis is represented by the small fleshy slips referred to arising from the palmar sesamoid.

In *Myrmecophaga jubata*‖ Macalister says that the flexor sublimis is unrepresented, but that a strong bicipital palmaris longus is present inserted by two slips, one on each side of the first phalanx of the powerful middle digit. The flexor profundus is very large, with five heads, but forming a single fleshy belly ending in three tendons—one central, enormous, for the third digit; one smaller, to the fourth toe; one still smaller to the index, and a very fine slip to the pollex

The same author notes the presence in *Myrmecophaga* of "a small superficial flexor of the fifth digit, arising from the annular ligament on its inner side by a tendon; this small muscle gives off a slip to the ulnar side of the lumbricalis for the medius."¶

In the absence of a flexor sublimis this muscle bears an interesting resemblance to similar slips in the *Civet* and *Jerboa* for the fifth digit (v. supra). No such arrangement was found in any of the other insectivorous Edentates examined by Macalister.

The arrangements of the flexor mass vary so considerably amongst Edentates that it is scarcely possible to give a synopsis of them. There is, however, a general tendency to imperfection in the segmentation of flexor sublimis, from the palmaris longus on the one hand, and from the flexor profundus stratum on the other; and in several cases flexor sublimis is entirely absent. The arrangement of the tendons of the deep flexor varies, of course, with the skeletal modifications of the manus. It is interesting to note the presence or absence of the palmar sesamoid which in several Edentate forms assumes large proportions, as in *Notoryctes*. It is present in *Manis*, but is absent in the other ant-eaters, and in *Orycteropus* Macalister remarks that "its presence in *Manis* is interesting, as it is characteristic of all the cataphractous edentates."¶

* xx., page 176. † xxii., page 172. ‡ xx., page 176, Note. § xxvii., page 250. ‖ xxxv., page 502. ¶ xxxv., page 503.

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In *Talpa** the flexor mass forms one single unsegmented muscle, from which comes a strong tendon; but in *Erinaceus** all the factors are present. In *Chrysochloris*† the flexor sublimis is very small, and passes only to the second finger. In the latter form the flexor profundus has a large ossification in it which reaches to the carpus.

The sublimis and profundus are generally well differentiated in this order.

Among the *Rodentia* Windle‡ notes that the flexor sublimis is nearly always a somewhat deeply placed muscle owing to its being overlapped by the large palmaris longus and flexor carpi ulnaris. According to the same author, the sublimis is reduced to a minimum in the *Carnivora*, existing nearly always merely as "an offshoot from the condylo-ulnaris near the lower end of the forearm." In this respect the *Carnivora* would seem to resemble the *Marsupialia*.

It would appear from Mivart's and Murie's account of the anatomy of *Dasyprocta*§ that a flexor brevis manûs exists as a small superficial muscular mass superficial to the flexor tendons, and arising from their surface, in addition to a long flexor sublimis. It had an apparent attachment or insertion into the proximal end of the fifth digit. In the right limb the long flexor sublimis gave tendons to the second, third, and fourth digits; on the left side to the fifth as well. It is probable that this flexor brevis manûs is simply a short accessory portion of the flexor sublimis corresponding closely to that found in the Civet (v. supra, p. 61). The condition in the Guinea-pig would also seem to be similar, according to Humphry,‖ though Mivart and Murie state that they failed to detect a corresponding structure in that animal.

Intrinsic Musculature of the Manus.

Three muscles only are present, viz.:—

M. abductor pollicis,

M. flexor brevis pollicis, and

M. flexor brevis indicis.

M. abductor pollicis (*brevis*) (figs. 6, 7, 10, 12, 13, 14, and 15, *ab.p.*). This muscle is contained in the prominent fold of naked skin which corresponds to the ball of the thumb, and which near its proximal part or base is in close relation to the projection of the rudimentary fifth digit.¶

It is a small but fairly thick quadrate muscle which arises from the aponeurosis of the manus near the wrist at a point corresponding to the anterior annular ligament (which is not very specially developed). It is inserted into the (morphologically) preaxial or radial manubrium** which juts out from the proximal phalanx of the pollex.

M. flexor brevis pollicis (figs. 13 and 14, *f.b.p.*) consists of two small flattened muscular bands arising together from the base of the metacarpal of the third digit. They are inserted into oppo-

* lxviii,, page 76. † xxvi., page 824. ‡ lxviii., page 77. § xl., page 402. ‖ xx., page 176, Note. ¶ Figs. 2, 9, 12, 13, 14, 15, and 17 "V." ** Fig. 15, "*p. 1.*"

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site sides of the proximal phalanx of the pollex, the radial insertion being in close relation to the insertion of the abductor.

Along with this may be described the *M. flexor brevis indicis*, represented by one small fleshy belly taking origin from the palmar aspect of the third metacarpal and inserted into the palmar aspect or perhaps the ulnar border of the base of the proximal phalanx of the index.

I know of no other instance amongst the Marsupials where modification by suppression of the intrinsic musculature of the hand has gone on to such an extent as in *Notoryctes*. And with regard to Marsupials generally, Young has remarked* that in no other class of mammals has the common mammalian "type" of this musculature been so constantly adhered to as in the *Marsupialia*. The case of *Notoryctes* is therefore the more noteworthy. There can be little doubt that the extreme degree of structural modification here exhibited is simply the result of a very marked specialisation from functional requirements. A study of the skeleton of the hand will amply confirm this conclusion.† Further, be it noted, that the structural modification of this group of muscles is wholly in the way of suppression, and that in so far as intrinsic muscles are present their homologies are quite easily interpreted. There is no representative whatever of the palmar layer of "*adductores*" The only representative of the dorsal layer of "*abductores*" is the abductor-pollicis; while the intermediate layer of "*flexores*" is represented by three bellies, viz., both bellies of the flexor brevis pollicis and the ulnar belly of the flexor brevis indicis.

In view of the anomalous reduction in the musculature of the region under notice, it is unnecessary to institute any systematic comparison with other forms, and it will suffice to take note of the condition as regards the muscles of the hand in a few animals in which we might expect similar, or at least parallel, modifications.

As already stated, the condition in *Notoryctes* is quite unique amongst marsupials. And although the *Echidna* is a powerful digger and burrower, a glance at its skeleton is sufficient to discourage one from expecting any very marked myological resemblance to the hand of *Notoryctes*. It is, however, the case that in *Echidna* we have an instance of considerable reduction from the type. The muscles present (apart from the lumbricals), with one exception, belong to the dorsal layer of abductores. These latter are—Abductor pollicis (Flexor brevis pollicis of Fewkes‡), and five interosseous muscles. The remaining muscle is reckoned by Mivart§ as a sixth interosseous, but Westling takes it to be equivalent both to a flexor brevis and an opponens pollicis.‡ It arises from the tendon of the flexor carpi radialis, and is inserted, according to Westling, into the proximal phalanx and metacarpal of the pollex on its radial aspect.

In *Chlamydophorus*|| Macalister found a slender cylindrical abductor pollicis, an opponens pollicis, and a muscle which he regarded as conjoint flexor brevis and abductor pollicis. He further states that these polliceal muscles are absent in *Cyclothurus*, *Bradypus*, and *Choloepus*,||

* xxxv., pages 158-9. † liv., Pl. viii. ‡ lxii., page 28. § xxxix., page 389. || xxvii., page 253.

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though elsewhere* he describes a superficial polliceal muscle in *Cyclothurus* inserted into the rudimentary trapezium and preaxial side of the manus.

In his "Report on the Insectivorous Edentates," the same author states that "the short muscles of the hand are very well developed."*

The only indication of the condition in *Chrysochloris* which I can find is in the following statement from Leche:—"Während bei *Myogale* noch besagte Flexores br. und Adductor pollicis die Handmusculatur bilden, fehlt eine solche bei *Chrysochloridæ* und *Talpina* gänzlich."†

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NOTORYCTES TYPHLOPS MYOLOGY.

EXPLANATION OF PLATES.

PLATE II.

Fig. 1.—*Dorsal aspect, superficial.* x 2.

References.

r.a.	M. cervico-auricularis.
c.t.	" cleido-trapezius ("clavo-cucullaris").
d.t.	" delto-trapezius ("trapezio-deltoid," "cephalo-humeral").
a.t.	" acromio-trapezius.
s.t.	" spino-trapezius.
rh.	" rhomboideus.
l.d.	" latissimus dorsi.
p.c.	" panniculus carnosus (humeral portion).
tr.	" triceps extensor antebrachii.
te.	" temporalis.
s.d.	" spino-deltoideus.
Au.	External auditory meatus.
Pa.	Parietal region of skull.
F.	Muscles of forearm.

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Plate III.

Fig. 2.—*View of right side of body, panniculus removed.* x 2.

s.m. M. sterno-mastoideus.
s.th. " sterno-thyroideus and sterno-hyoideus.
m.h. " mylo-hyoideus.
zy. " zygomaticus.
ma. " masseter.
te. " temporalis.
a.a. " attrahens aurem.
s.d. " spino-deltoideus ("acromio-deltoid," "scapular deltoid")
P.d. Parotid duct passing forwards to mouth.
S.g. Submaxillary gland and duct.
B.g. "Buccal" or "zygomatic" salivary gland.
Au. External auditory meatus.
O. Incision through abdominal walls.
Ol. Olecranon.
V. Nail of fifth digit.
L. Left manus.

(Other references as in Fig. 1.)

Plate IV.

Fig. 3.—*Ventral aspect.* x 2.

c.t. M. cleido-trapezius.
s.m. " sterno-mastoideus.
s.d.t. " spino-deltoideus, together with the conjoint delto-trapezius.
c.d. " cleido-deltoideus ("clavicular deltoid")
p.a. " pectoralis *a.*
p.b. " " *b.*
p.c. " " *c.*
s.th. " sterno-thyroideus.
s.h. " sterno-hyoideus.
m.h. " mylo-hyoideus.
o.h. " omo-hyoideus.
zy. " zygomaticus.
ma. " masseter.
a.a. " attrahens aurem.
s. " subclavius.
f.d. " flexor digitorum.
r.th. " rectus abdominis.
d. " digastricus.
P.g. Parotid gland.
B.g. "Buccal," or "zygomatic" salivary gland.
Au. External auditory meatus.
S.d. Duct of submaxillary gland.

Plate V.

Fig. 4.—*Deeper dorsal muscles of shoulder and neck.* x 2.

rh. M. rhomboideus.
r.a. " cervico-auricularis (with attachment to meatus).
te. " temporalis (covered by aponeurosis).
zy. " zygomaticus.
c.d.t. Cut edge of cleido- and delto-trapezius.
c.d.t.1. The same muscle turned aside.

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a.t. M. acromio-trapezius.
s.t. " spino-trapezius, reflected.
s.d. " spino-deltoideus.
tr. " triceps extensor antebrachii.
Ac. Acromion process.
Mss. Root of meso-scapular spine.
S.d.1. Part of origin of spino-deltoid.

Fig. 5.—*Muscles of right side of head, neck, and shoulder.* x 2.

zy. M. zygomaticus.
te. " temporalis.
d.t. " delto-trapezius.
c.d.t. " cleido-trapezius, *with* M. delto-trapezius, conjoint.
c.t. " cleido-trapezius.
a.t. " acromio-trapezius.
s.t. " spino-trapezius.
tr. " triceps extensor antebrachii.
s.d. " spino-deltoideus.
s.m. " sterno-mastoideus.
r.a. " cervico-auricularis.
a.a. " mandibulo-auricularis (attrahens aurem).
m. " masseter.
m.h. " mylo-hyoideus.
B.g. Buccal gland.
Ol. Olecranon process.

Plate VI.

Fig. 6.—*Right anterior extremity. Muscles of axillary region and inner aspects of scapula and arm, and of palmar surface of forearm* (clavicle turned outwards out of sight). x 4.

r.abd. M. rectus abdominis.
s.c. " subclavius. Its insertion has been exposed by turning outwards the clavicle with the clavicular deltoid as well as the delto-trapezius.
s.b.s. " subscapularis.
t.m. " teres major.
s.mg. " serratus magnus (anterior major portion).
s.tr. Scapular head of triceps.
i.h.tr. Inner humeral head of triceps.
l.d. M. latissimus dorsi.
l.d.t. Its tendon or aponeurosis where it spreads out over flexor carpi ulnaris.
an.i. M. anconeus internus (epitrochleo-anconeus).
f.c.u. " flexor carpi ulnaris (condylar and olecranon heads).
ab.p. " abductor pollicis. Its origin overlies the palmar sesamoid bone, but is not attached to it, arising merely from the palmar fascia.
d.t. " delto-trapezius (pulled aside).
h.p. Humeral panniculus fibres becoming inserted into axillary tendon of insertion.
p.a. M. pectoralis *a* } Cut; *a* and *b* turned somewhat outwards,
p.b. " " *b* } and *c* turned upwards to show tendon
p.c. " " *c* } of panniculus, biceps, &c.
f.b.c. " biceps flexor antebrachii.
b.a. " brachialis anticus.
e.c.r. " extensor carpi radialis.

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p.r.t. M. pronator radii teres.
f.c.r. " flexor carpi radialis
U.t. Ulnar (postaxial) tuberosity.
C.I. First costal arch, giving origin to M. subclavius and insertion to M. rectus abdominis.
sty. Radial styloid.
I., II., III., IV. Nails of respective digits.

Plate VII.

Fig. 7.—*Right anterior extremity. Muscles of inner aspects of scapula and arm and of palmar surface of forearm (clavicle turned outwards).* x 4.

s.c. M. subclavius (turned upwards).
rh. " rhomboideus.
s.mg. " serratus magnus.
o.h. " omo-hyoideus.
sbs. " subscapularis.
t.m. " teres major.
c.d. " cleido-deltoideus, turned aside with clavicle.
p.a. " pectoralis *a*
p.b. " " *b* } Cut, and *a* and *b* turned outwards.
p.c. " " *c*
ach. Section of axillary tendon connected with humeral panniculus.
l.d. M. latissimus dorsi.
s.tr. Scapular head of triceps.
i.h.tr. Inner humeral head of triceps.
f.b.c. M. biceps flexor antebrachii.
an.i. " anconeus internus (epitrochleo-anconeus).
f.c.u. " flexor carpi ulnaris (two heads).
f.c.r. " flexor carpi radialis.
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.
ab.p. " abductor pollicis (freed of its origin).
C.C.l. Coraco-clavicular ligament.
R.t. Radial tuberosity of humerus (preaxial).
U.t. Ulnar tuberosity of humerus (postaxial).
Co. Coracoid process.
int.ep. Ulnar or postaxial epicondyle (ento-condyle).
Ol. Olecranon.
sty. Radial styloid.
p.ses. Palmar sesamoid bone.

Plate VIII.

Fig. 8.—*Right anterior extremity. View of deeper dorsal muscles of scapula and humerus.* x 4.

m.s.s. Meso-scapular spine.
p.s.s. Post-scapular spine.
m.seg. Meso-scapular segment.
p.s.m.ligt. Postscapulo-metacromial ligament.
cl. Clavicle.
d.p.tub. Deltopectoral tuberosity.
ol. Olecranon process.
s.s. M. supraspinatus.
s.c. " subclavius.
i.s. " infraspinatus.
b.a. " brachialis anticus.
s.tr. " triceps (scapular head).

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s.tr.1. Surface of origin of scapular triceps.
o.tr. M. triceps (outer humeral head).
an.e. " anconeus externus (anconeus quartus),
ext. Extensor muscular mass of antebrachium.

Plate IX.

Fig. 9.—*Right anterior extremity. Dorsal aspect of forearm and manus, viewed slightly from the ulnar side.* x 4.

s.tr. Scapular head of triceps.
l.d. M. latissimus dorsi.
an.e. " anconeus externus.
e.c.u. " extensor carpi ulnaris.
e.c.d. 1, 2. " " communis digitorum (first and second parts).
e.c.r. " " carpi radialis.
e.i.m. " " indicis et medii digiti.
e.m.p. " " ossis metacarpi pollicis (abductor poll. longus).
f.c.u. " flexor carpi ulnaris.
d.c.lig. Dorsal carpal (posterior annular) ligament.
rad.sty. Styloid process of radius.
ect. Ectocondyle.
Ol. Olecranon.
III., IV., V. Claws of 3rd, 4th, and 5th digits respectively.

Plate X.

Fig. 10.—*Right anterior extremity. Muscles of palmar aspect of forearm.* x 4.

pect. Pectoral muscles.
f.b.c. M. biceps flexor antebrachii.
b.a. " brachialis anticus.
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.
flex.dig. " flexor digitorum.
abd.poll. " abductor pollicis (brevis).
e.m.p. " extensor ossis metacarpi pollicis (abductor pollicis longus).
e.i.m. " extensor indicis et medii digiti.
p.ses. Palmar sesamoid bone.
rad.sty. Styloid process of radius.
for.f.c.r. Foramen in scapholunar for tendon of M. flexor carpi radialis.
I., II., III. Claws of 1st, 2nd, and 3rd digits respectively.

Plate XI.

Fig. 11.—*Right anterior extremity. View of radial aspect of forearm and manus.* x 4.

e.c.r. M. extensor carpi radialis.
p.r.t. " pronator radii teres.
f.c.r. " flexor carpi radialis.
e.m.p. " extensor ossis metacarpi pollicis (abductor poll. longus).
e.i.m. " extensor indicis et medii digiti.
e.c.d.1. " extensor communis digitorum (tendon for digit 3).
rad.sty. Styloid process of radius.
p.ann.lig. Dorsal carpal (posterior annular) ligament.
p.1. Proximal phalanx of pollex.
I., II., III. Claws of 1st, 2nd, and 3rd digits.

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Plate XII.

Fig. 12.—*Right anterior extremity. View of palmar aspect of wrist, with morphologically dorsal aspect of pollex and index.* x 4.

p.r.t. M. pronator radii teres.
f.c.r. " flexor carpi radialis.
f.dig. " flexor digitorum.
f.c.u. " flexor carpi ulnaris.
e.c.r. " extensor carpi radialis.
e.m.p. " extensor ossis metacarpi (abd. longus) pollicis.
ab.p. " abductor (brevis) pollicis.
e.i.m. " extensor indicis et medii digiti.
N.med. Nervus medianus.
p.1. Proximal phalanx of pollex.
I., II., III. Claws of 1st, 2nd, and 3rd digits respectively.
V. Apex of pisiform where it meets apex of 5th digit.

Fig. 13.—*Right anterior extremity. View of palmar aspect of manus (pollex and index forcibly abducted and permanent opposition reduced).* x 4.

f.c.u. M. flexor carpi ulnaris.
f.dig. 1, 2, 3 } " flexor communis digitorum
ab.p. " abductor pollicis.
f.b.p. " flexor brevis pollicis.
f.c.r. " flexor carpi radialis.
I.–V. Claws of respective digits.
p.1. Proximal phalanx of pollex.
p.ses. Palmar sesamoid bone.
pi. Pisiform bone.

Plate XIII.

Fig. 14.—*Right anterior extremity. Palmar aspect of manus* (attitude as in Fig. 13). x 6.

rad.sty. Styloid process of radius.
i.t., *m.t.*, *a.t.* Tendons of flexor communis digitorum to index, medius, and annularis respectively.
f.b.p. M. flexor brevis pollicis.
*m.*I., *m.*II. First and second metacarpal bones.
s.c. Scaphocarpal.
tr. Trapezium.

(Other letters as in Fig. 13.)

Plate XIV.

Fig. 15.—*Right anterior extremity. Deep dissection of palmar aspect of forearm.* x 4.

s.s. M. supraspinatus.
f.b.c. " biceps flexor antebrachii.
b.a. " brachialis anticus.
an.i. " anconeus internus.
f.rad. " flexor digitorum (radialis).
s.r.b. " supinator radii brevis.
f.c.u. " flexor carpi ulnaris (olecranon head).
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.

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s.tr. Surface of origin of scapular triceps.
d.p.t. Delto-pectoral tuberosity.
Ol. Tip of olecranon.
Ent. Entocondyle.
rad.sty. Styloid process of radius.
int.lig. Interosseous radio-ulnar ligament (inferior).
u.c.ligt. Very strong, thick, and tendinous-looking ulno-carpal ligament, proceeding from the palmar aspect of the lower end of the ulna to a prominent ridge of the scapho-carpal (to which also the anterior annular ligament is attached).

Plate XV.

Fig. 16.—*Right anterior extremity: Deep dissection of dorsal aspect of forearm.*

ext. Origin from ectocondyle of superficial extensor muscles.
an.e. M. anconeus externus.
s.r.b. " supinator radii brevis.
e.c.u. " extensor carpi ulnaris (cut) and its tendon of insertion.
e.c.r. " extensor carpi radialis (cut).
e.c.d.1., *e.c.d.2.* " extensor communis digitorum tendons.
e.m.p. " extensor ossis metacarpi pollicis (abductor pollicis longus).
e.i.m. " extensor indicis et medii digiti.
Ol. Recurved tip of olecranon process.
III.-V. Claws of respective digits.

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Notes on a New Classification of the Brachyscelidæ.

By W. W. Froggatt, Tech. Mus., Sydney, N.S.W.

(Communicated by Oswald B. Lower, F.E.S.).

[Read April 3rd, 1894.]

[Abridged.]

In the last Part of the Transactions of your Society, there is a paper entitled "Descriptions of South Australian Brachyscelid Galls," by J. G. O. Tepper, F.L.S., upon which I beg the favor of being allowed to make the following remarks.

In this paper he ignores my classification of the coccids, which is clearly stated and defined on the form, spines, tubercules, and anal appendages of the female insect. He passes over the coccids with a few brief notes, in which he alters my term "anal appendages" into "tail bristles"—a very misleading term, as they are certainly not at all like bristles, being hard, stout, and awl-shaped.

Mr. Tepper makes a new classification of the family from the galls produced by the insects, and passes over the latter, which, with one exception, he does not even describe in his *new species*.

He says "a characteristic specific difference appears to be exhibited in the direction of the axis of the gall," and on this basis gives a classification of the described galls. Now, this vertical, lateral, or dependent form can often all be found in a series of one species, and is of no value for classification. It is impossible to classify galls of any genus, without an exact knowledge of the insects that form them; and, until Mr. Maskell and I have published our recently read papers, it is simply a waste of time making a classification of the family and genera. He says—"All Brachyscelid galls have a minute opening or aperture at or near the summit, or *exceptionally* at the base." If he had known anything about the genera *Opisthoscelis* and *Ascelis* he would have found that the opening was oftener at the base than the apex.

Again, Mr. Tepper says "that regarding the duration of the life of the *gall*, or insect, nothing definite seems to be known," but from his own observations, it may take several years to produce some of the larger woody galls. Now, the giant among them all (*B. duplex*, Schrader) never takes more than a season to become fully developed, and others, as *B. pileata*, Schrader, when

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infesting young, vigorous saplings, grows with wonderful rapidity; the younger and more sturdy the tree, the quicker it grows.

Having dealt with Mr. Tepper's classification, I should like to make a few remarks upon his so-called new species, most of which are described from aborted or abnormal forms of very common species already described. If a classification of the galls were admissable, there would be no end to new species, as many as a dozen varieties of many of the galls being obtainable from several species, all of which could be easily placed if the full-grown female were examined.

Not content with dealing with the Brachyscelid proper, Mr. Tepper figures and describes a gall on *Beyeria opaca* as a new Brachyscelis, without the least idea of what insect formed it. The figures show a very variable gall, which might be formed by anything. The genus Brachyscelis only form galls on species of Eucalyptus.

Ascelis multitudinea, Tepper, is treated in the same manner. The galls figured are not like any *Ascelis* known to me, but very much like the galls of a *Psylla*, while the insect figured as the gall-maker, evidently an inquline, is not a female coccid of this group.

The following "new species," according to Mr. Tepper's descriptions and drawings, are synonymes of other species :—

(2) Brachyscelis ovicoloides, Tepper, is the curved form of *B. pileata*, Schrader, if the section was taken as typical; if the gall, it is an aborted *B. ovicola*, Schrader.

(3) B. regularis, Tepper, is the broad, short-stemmed form of *B. pedunculata*, Olliff.

(4) B. glabra, Tepper, is an abnormal form of *B. ovicola*.

(5) B. subconica, Tepper, is one of the very common forms of *B. conica*, Froggatt.

(6) B. urnalis, Tepper, is *B. Schraderi*, Olliff, found in the western parts of N.S. Wales.

(7) B. strombylosa, Tepper, is *B. crispa*, Olliff, a very common gall about Sydney.

The last two, called *B. calycina* and *B. Neumanni*, are new; but as they both come from the same locality, and allied, if not the same species of Eucalyptus, it is most likely that they are only varieties of one species; but this can only be settled by examining females from each species.

I think I have proved that Mr. Tepper has, by the recent contribution to our knowledge of the gall-making coccids, in his haste to make new species, without a sufficient grasp of the subject, added little new, and heaped up synonyms that will bother all future students.

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NEW AUSTRALIAN HETEROCERA.

By OSWALD B. LOWER, F.E.S., &c.

[Read May 1, 1894.]

HEPIALIDÆ.

HEPIALUS THERMISTIS, *n. sp.*

Female, 108 mm. Head, thorax, palpi, abdomen, antennæ and legs ochreous-fuscous. Forewings elongate-triangular. Costa slightly sinuate in middle; ochreous-fuscous, strigulated more or less with darker; costa with a few obscure darker quadrate spots; traces of an irregular darker band from costa at three-fourths to inner margin at three-fourths, most distinct in middle. Cilia ochreous-fuscous mixed with whitish. Hindwings with hindmargin rounded; vermillion pink; cilia as in forewings. Underside of both wings vermillion pink. This species is very different from any other known Australian species

One specimen from Mackay, Queensland.

HEPIALUS CYANOCHLORA, *n. sp.*

Male, 70-74 mm. Head and thorax grass-green, palpi whitish; abdomen reddish, posteriorly greenish tinged, anterior legs dull purplish, tibiæ with a broad band of green, other legs reddish tinged. Forewings elongate-triangular, costa slightly sinuate in middle, hindmargin bowed; pale grass-green, shading into opalescent blue in certain lights, crossed by several transverse strigulæ or correlated bands of opalescent whitish; a slightly curved oblique white fascia from three-fourths costa to beyond middle of inner-margin, edged posteriorly by a dark-green line, anteriorly suffused into ground-colour; costa purplish-fuscous in middle, with three small whitish-green spots at equal distances; cilia opal-whitish, tinged with green. Hindwings with hindmargin rounded; pale opalescent blue; costa and hairs at base salmon-pink.

Two specimens at Mackay, Queensland, in December. My specimens are not in the best condition, but quite good enough to denote a peculiarly beautiful species.

BOMBYCIDÆ.

PINARA ERUBESCENS, *n. sp.*

Male, 50 mm.; female, 75 mm. Head, palpi, legs and thorax ochreous, terminal joint of palpi purplish-red. Abdomen ochreous-

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whitish, in male tinged with yellow; tibiæ and tarsi fuscous-purple; patagia fuscous-purple. Antennæ fuscous-purple, pectinations yellowish. Forewings elongate-triangular; costa gently arched, hindmargin obliquely rounded; ochreous-pinkish, or pale flesh colour, slightly darker posteriorly, veins neatly outlined with yellow. Costa at base with a small spot of fuscous-purple; a reddish discal dot at one-third of disc. Hindwings with hindmargin rounded, colour as forewings, in male strongly tinged with orange towards hindmargin in middle; tinged on costa with darker pink; cilia yellowish-white.

Very similar to "*fervens*," but a much more chaste insect. The cocoon of this is rugose, and of a pale-pink colour. Two pair bred by Mr. G. Barnard, Duaringa, Queensland. The typical insects are in the collection of the Brisbane Museum.

NOTODONTIDÆ.

NOTODONTA CYCNOPTERA, *n. sp.*

Male, 46 mm. Head, palpi, antennæ, abdomen and thorax ashy-grey whitish. Thorax more whitish, with a large dark-fuscous wedge-shaped patch. Antennal pectinations eight; apical one-fifth simple. Legs very hairy, white; tarsi fuscous, with whitish apical rings. Forewings elongate triangular, costa straight, arched towards apex, apex round-pointed, hindmargin obliquely rounded; ashy-grey-whitish; a white basal patch, bounded by an irregular blackish line from beyond one-fourth of costa to about one-third inner-margin; in this patch are two short black spots or streaks, one on costa in middle and one in middle of base; a strongly irregularly dentate black line, posteriorly edged with white, from about three-fourths of costa to near anal angle, with two acute projections, above and below middle veins beyond this outlined suffusedly with black; a lunate white mark at end of cell; a suffused, rather thick, waved white subterminal line; a black hindmarginal line, somewhat interrupted at extremities of veins; cilia ashy whitish, darker at apex. Hindwings with hindmargin rounded; white, with a broad black hindmarginal band, broadest at apex, hardly reaching anal angle; cilia white, with a narrow blackish basal line.

Two specimens, Duaringa, Queensland, in March. (Coll. Barnard.)

Geometrina.

HYDRIOMENIDÆ.

HYDRIOMENA CALLIZONA, *n. sp.*

Male, 30 mm. Head, palpi, thorax and abdomen dark-fuscous, abdomen with second segment broadly white. Legs and antennæ greyish, antennal ciliations one-sixth, palpi one and a-half. Fore-

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wings triangular, hindmargin waved, rounded, oblique; dark-fuscous; posterior edge of basal patch from one-eighth, costa to one-eighth inner-margin, somewhat curved; anterior edge of median band from one-third of costa to one-third inner-margin, strongly dentate, and curved inwards; posterior edge from two-thirds of costa to two-thirds inner margin, contracted on inner margin, with a moderate bidentate projection above middle; a large black discal dot between, but nearest anterior line; the ground-colour between basal patch and anterior line of median band is occupied, except along costa, by a large white blotch; a similar white blotch above anal angle, suffused with ground-colour towards hindmargin; a moderate rounded white spot on middle of hindmargin, and an irregular white blotch immediately above, curved towards apex, but not reaching it; a black hind-marginal line, interrupted by ochreous-white spots at extremities of veins; cilia light fuscous. Hindwings with hindmargin waved; colour hindmarginal dots and cilia as in forewings, white blotches absent, posterior edge of median band nearly straight, from two-thirds of costa to two-thirds inner margin, limited by a blackish dot-like line, immediately followed by a fine dark fuscous line. An abnormal-looking species, unlike anything I have previously seen. It approaches somewhat "*brujata*," Gn., but I hardly think it is a variety of that species.

One specimen; Billopp, Tasmania, in February (Coll. Barnard).

XANTHORHOE (?) PLATYDESMA, *n. sp.*

Female, 31 mm. Head, palpi, antennæ, thorax, and abdomen deep chocolate; thorax with a blackish suffused anterior band. Legs fuscous, post pair greyish. Forewings triangular, costa moderately arched, hindmargin waved, obliquely rounded; deep chocolate, anterior edge of basal patch limited by a fine obscure whitish line, immediately followed by a thick black streak or transverse band, median portion of median band wholly suffused with ochreous-whitish, and containing numerous irregular waved fuscous transverse lines, anterior edge from about one-third of costa to one-third inner margin, posterior edge from three-fourths costa to three-fourths inner margin, with a bidentate projection in middle, suffusedly edged with whitish-ochreous throughout, veins beyond irregularly dotted with whitish-ochreous; subterminal line formed by whitish-ochreous dots, the middle one much larger and conspicuous; a waved black hindmarginal line; cilia fuscous-chocolate. Hindwings with hindmargin waved, rounded; deep chocolate; veins dotted here and there with numerous whitish-ochreous spots; markings obliterated, except posterior edge of median band, which appears as a fuscous-curved line, dotted on veins with blackish, and edged posteriorly on inner

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margin with ochreous-whitish; hindmarginal line and cilia as in forewings. Between *repentinata*, Walk., and *anaspila*, Meyr. The ground is different from any other species I am acquainted with.

One specimen in December. Duaringa, Queensland (Coll. Barnard).

XANTHORHOE PELOCHROA, *n. sp.*

Male, 25 mm.; female, 25. Head, palpi, thorax, abdomen, and legs dark-fuscous; palpi one and a half, posterior legs ochreous-tinged, abdomen in male with pairs of black dots at base of segments, in female with black segmental rings and a minute yellowish spot on dorsum at base of segments, second segment paler. Antennæ fuscous, pectinations six. Forewings triangular, hindmargin waved, obliquely rounded; dull ochreous-fuscous, darker in male, with numerous waved transverse lines, and with a few minute white scattered dots; outer edge of basal patch hardly traceable, in male followed by a row of obscure minute black dots; median band hardly darker than ground-colour. Anterior edge from beyond one-third of costa to one-third inner margin, curved inwards somewhat; posterior from near three-fourths of costa to two-thirds inner-margin, with a moderate blunt projection in middle; a well-defined, sometimes obscurely-whitish edged black discal dot in middle; a somewhat thick, irregular, crescentic light-ochreous mark above, and immediately following angulation of median band; an irregular, triangular, apical patch of dull-ochreous, from which proceeds a fine subterminal line of same colour; not in female. A waved, fine, black, hindmarginal line; cilia ochreous-fuscous, tips whitish. Hindwings with hindmargin waved, rounded; dull-fuscous, with numerous waved, darker, transverse lines, more distinct on inner-margin; a black discal dot at one-third from base above middle; a broad, irregular, waved, ochreous band from middle of costa to middle of inner margin; obsolete in female; a similar but more suffused band immediately before hindmargin; not traceable in female. Hindmarginal line and cilia as in forewings.

Two specimens from G. Lyell, jun., Gisborne, Victoria. It comes nearest "*repentinata*," Walk.; the lunate mark beyond median band is a good recognisable character.

MONOCTENIADÆ.

NEARCHA DIDYMOCHROA, *n. sp.*

Female, 29 mm. Head, thorax, legs, and abdomen pale ashy-grey. Antennæ ochreous; palpi dark-fuscous, 1½. Forewings triangular, costa hardly arched, apex acute, hindmargin slightly sinuate beneath apex, thence bowed, oblique; pale-ashy-grey or

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slate colour; a very indistinct black line from before one-third of costa to one-third inner-margin; a small median black discal spot; a fine black line from four-fifths of costa to beyond three-fourths of inner-margin, with a sharp angulation beneath costa; a similar parallel line, starting from bend of angulation marked with irregular wedge-shaped spots posteriorly. Between the two lines the ground-colour is pale-ochreous-yellow; veins between lines and hindmargin neatly outlined with black, and with a row of hindmarginal dots at extremities; cilia grey-whitish. Hindwings with hindmargin rounded; colour, hindmarginal and discal dots as in forewings, first line obsolete, second and third as in forewings, without angulations, and not reaching costa.

Two specimens Duaringa, Queensland, in August (Coll. Barnard). Distinct by the angulated lines. The heads of the specimens are not in good condition, having become mildewed.

EPIDESMIA THERMISTIS, *n. sp.*

Female, 32 mm. Head, palpi, and thorax reddish-fuscous, thorax posteriorly fuscous. Abdomen and legs greyish-ochreous. Forewings elongate triangular; costa hardly arched; hindmargin bowed, obliquely rounded; reddish-fuscous, darker posteriorly; costal edge red throughout, edged suffusedly beneath by a thicker blackish-shade throughout; a dull, reddish-fuscous spot on inner-margin, at about one-fourth; a large, roundish, blackish discal spot beyond middle of disc above middle; an ochreous-red, straight line from beneath costa at five-sixth to inner at four-fifth, posteriorly edged by a broad, blackish band, inclined to be separated into large spots, which are centred by smaller and blacker spots; area beyond this coppery-fuscous; a hindmarginal row of black spots; cilia ochreous-reddish tinged. Hindwings with hindmargin rounded, slightly prominent towards apex; greyish-white, becoming broadly light-fuscous towards hindmargin; hindmarginal dots and cilia as in forewings.

One specimen at Uraidla, South Australia, in November. In general appearance resembles a *Nearcha*.

DICHROMODES ORTHOGRAMMA, *n. sp.*

Male, 22 mm. Head, palpi, thorax, and abdomen fuscous-leaden, minutely dusted with leaden-white. Antennæ whitish, annulated with fuscous; ciliations three and a half, palpi two and a half. Legs greyish. Forewings triangular; costa nearly straight, hindmargin bowed, oblique; fuscous-leaden, minutely dusted with whitish, markings dark fuscous; a line from beyond one-third costa to one-third inner-margin, slightly sinuate beneath costa; an almost straight line, somewhat dot-like, from three-fourths costa to two-thirds inner-margin, edged posteriorly by an

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equal width of whitish; a discal spot midway between the two fuscous lines. Subterminal line fuscous, strongly waved throughout and indistinctly edged posteriorly with whitish; a black interrupted hindmarginal line; cilia fuscous-whitish, terminal half grey-whitish. Hindwings with hindmargin rounded, fuscous; hindmarginal line and cilia as in forewings; a small black dash on inner margin beyond middle, edged with whitish, below which is a small piece of ground colour as in forewings.

Two specimens, Duaringa, Queensland, taken in November (Coll. Barnard). Nearest *estigmaria*, Walk.; the antennal pectinations put it out. It is not unlike, superficially, a large *ischnota*, Meyr.

XENOMUSA TETRAMERA, *n. sp.*

Female, 40 mm. Head, thorax, and abdomen pale-ochreous, with a few scattered minute fuscous scales; thorax posteriorly with a fuscous patch, and two small fuscous dots on first segment of abdomen. Legs greyish-ochreous, somewhat infuscated. Palpi fuscous; antennæ yellow, dotted with fuscous. Forewings triangular; costa strongly arched near base, thence tolerably straight; apex acute, hindmargin strongly waved, bowed, oblique; pale greyish-ochreous, minutely scattered with small dark-fuscous scales; four transverse dark-fuscous bands—First, thick, curved outwards from one-fifth costa to one-fifth inner-margin; second, from one-third inner-margin to three-fourths across wing, surmounted by a well-defined fuscous discal dot; third, moderately broad, from about three-fourths of costa to about middle of inner-margin, gently curved inwards throughout; fourth, thick, irregular, interrupted above and less strongly below middle, at apex expanded as a suffused patch; a hindmarginal series of obscure fuscous spots; cilia ochreous-grey. Hindwings with hindmargin strongly waved; colour, markings, &c., as in forewings, but markings not so well defined; first line absent.

One specimen, Victoria (in National Museum).

ONYCHODES EUCHRYSA, *n. sp.*

Male, 45 mm. Head, legs, palpi, abdomen, and thorax yellow; second segment of abdomen purplish. Antennæ whitish, pectinations ochreous. Forewings triangular; costa gently arched, somewhat abrupt at base; hindmargin obliquely rounded; bright yellow, strigulated with dull purplish, more especially along costa throughout; a small blackish dot above inner-margin at one-sixth, another similar obliquely above and beyond; a blackish median discal dot; an indistinct outwards-curved purplish streak from one-third of costa to one-third inner-margin; an irregular thick dentate purplish streak from apex of wing to inner-margin and there meeting first streak; an indistinct row of small fuscous

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dots from costa before apex to one-half across wing; a hind-marginal row of blackish dots; cilia golden-yellow. Hindwings with hindmargin slightly crenulate, rounded; colour and markings as in forewings, but first streak straight. Forewings beneath pale-whitish-yellowish; a strongly dentate reddish line from costa at four-fifths to three-fourths across wing. Hindwings with colour and markings as in forewings.

One specimen, Mulgrave River, Cairns, Queensland, in February (Coll. Barnard).

ARRHODIA ORTHOTOMA, *n. sp.*

Male, 42 mm. Head, thorax, palpi, legs, and abdomen greyish-ochreous; abdomen sparsely irrorated with small black scales; thorax with a suffused anterior band. Antennæ greyish, pectinations four. Forewings triangular; costa straight, apex rounded, hindmargin hardly waved, somewhat sinuate below apex, thence oblique; greyish-ochreous, suffusedly irrorated with fuscous; a dark fuscous, rather thick line from beyond one-third of costa to one-third inner-margin, with a strong angulation immediately beneath costa; a similar line edged posteriorly with a suffused row of dark fuscous spots from three-fourths of costa to beyond middle of inner-margin; space between the first and second lines suffused with whitish, especially on lower half, where it is strigulated with fuscous; the upper half contains two quadrate spots just below angulation of second line; costa from first line to apex rather broadly paler greyish-ochreous, attenuated anteriorly; a suffused fuscous spot on costa near apex; cilia fuscous. Hindwings with a deep concavity at apex, making apex prominent, thence broadly waved, rounded; colour, except along hindmargin, where it is greenish tinged, and markings same as in forewings, but quadrate spots and first line absent; a small transparent discal spot outlined with dark fuscous placed on second line; cilia as in forewings.

One specimen, Duaringa, Queensland (Coll. Barnard). I have seen a second specimen. In general appearance superficially resembling *Monoctenia obtusata*, Walk. It has a curious character in possessing the transparent discal spot so common to that genus; the antennæ, however, refer it to *Arrhodia*.

MONOCTENIA ODONTIAS, *n. sp.*

Female, 34 mm. Head, antennæ, and palpi reddish-crimson; palpi whitish towards base. Legs ochreous-whitish, banded and spotted with dull crimson. Thorax fleshy-white; abdomen fleshy-grey. Forewings triangular; costa nearly straight, arched at apex; apex acute, hindmargin strongly dentate, somewhat sinuate in middle; greyish-flesh colour, costa yellowish, strigu-

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lated with fuscous-purple; a very indistinct fuscous discal dot; a small cuneiform spot on costa at three-fourths, from which proceeds a curved row of suffused indistinct dots to beyond middle of wing; a suffused leaden-purplish mark on inner-margin before anal angle; cilia white, basal half purplish-fuscous. Hindwings with hindmargin rounded, dentate; apex and middle dentation prominent; a hardly perceptible waved line (dotted on points) from two-thirds of costa to two-thirds inner-margin; cilia as forewings. Underside ochreous-pink; markings of upperside more distinctly reproduced; a small purplish blotch on middle of hindmargin of forewings; a similar blotch at apex of hindwing.

One specimen from Duaringa, Queensland; also one in Brisbane Museum without record. This species is allied somewhat to *subustaria*, Walk., but differs in the hindmargin, hindwings, &c.

MONOCTENIA ORTHODESMA, *n. sp.*

Female, 54 mm. Head, antennæ, palpi, thorax, and abdomen pale-biscuit color; palpi beneath white. Legs pale-pinkish-white. Forewings elongate; costa almost straight, slightly curved at apex; apex acute, hindmargin sinuate beneath apex, thence bowed, oblique; pale-biscuit colour; an almost straight dark-reddish line from costa just before apex to inner-margin at about two-thirds, edged anteriorly throughout with a pale-yellow line; cilia dark-reddish. Hindwings with hindmargin almost straight; cilia, colour, and markings as in forewings; costa broadly snow-white, becoming suffused with pale carmine pink at and around apex.

One specimen, Brisbane, in October. Chaste and elegant; not to be confused with any other described species. The hindwings beneath have a large purplish patch placed as in *vinaria*, to which it is allied.

MONOCTENIA CYCNOPTERA, *n. sp.*

Male, 40 mm. Head, thorax, and abdomen pale-greyish, somewhat tinged with slate colour; legs grey; antennæ ochreous, pectinations four; palpi greyish-ochreous. Forewings triangular; costa straight, apex acute, hindmargin sinuate beneath apex, thence strongly bowed, oblique; pale slaty-grey, minutely and imperceptibly dusted with blackish; a ferruginous spot on inner-margin at about two-thirds, from which proceeds a faint pale-yellowish streak towards apex; cilia pale-ferruginous. Hindwings with hindmargin rounded, somewhat prominent at apex; snow-white, without markings; cilia white. Forewings beneath with a large blotch of claret colour just below middle of hindmargin.

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One specimen received from Mr. A. Zeitz, taken at Lake Mulligan, South Australia. It is a conspicuously distinct species, and is remarkable for the colour of hindwings, all the other species known to me being more or less unicolorus.

MONOCTENIA (?) XANTHASTIS, *n. sp.*

Female, 55 mm. Head, palpi, thorax, and abdomen pale-ochreous-fuscous. Antennæ yellowish, pectinations one. Legs yellowish-brown. Forewings elongate-triangular, strongly dilated posteriorly; costa rather strongly arched, hindmargin rounded, oblique (apex broken); pale-ochreous, finely dusted with light-fuscous; a straight dark-fuscous line from beyond one-fourth of costa to one-third inner-margin; a similar curved-inwards line from three-fourths of costa to two-thirds of inner-margin; a transverse linear discal dot midway between these lines; cilia dark-brown, with a yellow line near base. Hindwings with hindmargin rounded; bright golden orange, markings and cilia as in forewings, but first line and discal dot absent. Forewings beneath bright golden yellow, strongly suffused with dark brown strigulations along costa and hindmargin; discal spot much larger. Hindwings with colour as forewings wholly strigulated with dark brown, more thickly towards base.

One specimen from Mr. R. Illidge, of Bulimba, Queensland, who took it at Gympie in March. It is certainly not referable to the genus *Monoctenia*, but is placed here provisionally, the curious unpectinated antennæ of the female would in itself warrant a new genus being formed, but in the absence of the male I shall place it in *Monoctenia*. The nearest approach to it as regards superficial appearance is *Eumelea rosalia*, Cram.

GEOMETRIDÆ.

EUCHLORIS (IODIS) MICROGYNA, *n. sp.*

Female, 22 mm. Head dull yellowish-green, fillet greenish-glaucous. Antennæ and legs yellowish-white; posterior legs white. Thorax and abdomen dull glaucous-green; abdomen with three minute snow-white crests on middle segments. Forewings elongate-triangular; costa gently arched, hindmargin slightly angulated in middle, upper half straight, lower half oblique; dull-glaucous-green, a darker green discal dot, a hindmarginal row of minute snow-white spots at extremities of veins; cilia greenish. Hindwings with hindmargin angulated on vein four; colour, markings, and cilia as in forewings; cilia lighter towards anal angle. Between *neptunus*, Butl., and *centrophylla*, Meyr.

One specimen, taken by Mr. C. J. Wild at Brisbane (type in Brisbane Museum).

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EUCHLORIS GONIOTA, *n. sp.*

Female, 29 mm. Head greenish-white; palpi long, fuscous, apex of second and terminal joints snow-white. Legs and antennæ fuscous, tibiæ and tarsi suffusedly ringed with white, posterior pair white. Thorax bright pea-green; abdomen light-fuscous, beneath snow-white. Forewings elongate-triangular; costa rather strongly arched, especially at base; hindmargin bowed, waved, with a rounded angulation on veins four and five; bright pea-green, with scattered whitish strigulæ; costa brownish throughout (strigulated with whitish) attenuated at extremities; a large roundish pale flesh-colored patch, mixed with fuscous on middle of hindmargin, continued narrowly along hindmargin to apex, edged anteriorly very finely with fuscous or dark-fuscous; a narrow, waved, somewhat interrupted ferruginous line, obsolete towards anal angle; cilia greyish-ochreous or pale flesh-colour on hindmarginal patch, green on posterior half of hindmarginal and round anal angle, with a small spot of same colour at termination of veins. Hindwings with hindmargin strongly waved and angulated, more prominently on veins four and six; colour, markings, and cilia as in forewings, but hindmarginal patch with rounded portion less prominent; a small triangular spot at termination of first vein; cilia round, anal angle snow-white.

One specimen from Mackay, Queensland, taken by Mr. R. E. Turner and presented to the Brisbane Museum, where the type is preserved.

EUCHLORIS ORTHODESMA, *n. sp.*

Male (?), 30 mm. Head green; antennæ white (?), broken; thorax glaucous-green, abdomen glaucous-green, posterior segments whitish, silkly, mixed with yellowish-ferruginous. Legs white, anterior tibiæ and tarsi tinged with fuscous. Forewings elongate-triangular; costa gently arched, apex hardly acute, hindmargin bowed, obliquely rounded; pale iridescent moonlight-blue, extreme costal edge ochreous; a dark-green basal patch, posterior edge nearly straight from one-third costa to one-fourth inner-margin, a broad, dark-green, irregularly-edged, tolerably straight transverse band from three-fourths of costa to three-fourths inner-margin; a darker green discal dot midway between this and basal patch; a rather narrow dark-green hindmarginal fascia, narrower towards anal angle; cilia pale-greenish. Hindwings with hindmargin strongly angulated on vein four; colour cilia, and markings as in forewings, but transverse band broader, especially towards anal angle; hindmarginal fascia not reaching anal angle.

Cairns, Queensland; one specimen, taken in September. This species has a peculiar facies, and reminds one of the Indian forms, to some of which it is doubtless allied.

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EUCHLORIS MEGALOPTERA, *n. sp.*

Male, 38 mm. Head and palpi greenish-ochreous, crown and antennæ snow white, antennal pectinations five, ochreous. Legs whitish, anterior pair greenish-tinged. Thorax and abdomen green, sides and apex of abdomen white. Forewings elongate triangular, costa strongly curved at base, thence straight, at apex strongly curved, apex acute, hindmargin gently bowed, oblique; bright yellowish-green; costal edge snow-white throughout, attenuated at extremities; a reddish discal dot just before and above middle of wing; a fine ferruginous hindmarginal line; cilia whitish, terminal half ferruginous. Hindwings with hindmargin strongly angulated on vein four; colour hindmarginal line and cilia as in forewings; a large reddish discal dot centred with ferruginous.

One specimen from North Queensland, without further locality, in collection Brisbane Museum. This species is the largest Australian species known, and is very distinct, but not unlike in shape of wing an *Agathia*.

Tortricina.

TORTRICIDÆ.

DICHELIA COSMOPIS, *n. sp.*

Male, 13 mm. Head, thorax, palpi, legs, antennæ, and abdomen dark-fuscous, legs ringed with dull white, anterior coxæ ochreous. Forewings moderate, elongate, apex obtuse, hindmargin obliquely rounded; dark chocolate, with ochreous-yellow markings; a broad, nearly straight fascia, much broader on inner margin from about one-third of costa to before middle of inner-margin, containing traces of transverse lines of ground colour, especially on costa and inner-margin; a small triangular spot on costa at about two-thirds containing a small dot of ground colour; two or three minute dots on costa towards apex, and a few ochreous scales above anal angle; cilia dark-fuscous. Hindwings bright orange, a narrow blackish suffused hindmarginal band tending to be produced along veins; cilia fuscous, with a blackish basal line.

Two specimens received from Mr. G. Lyell, jun., Gisborne, Victoria. This species is very near *lychnota*, Meyr. (of which it may ultimately prove a variety), but differs in the more sharply-defined markings and the triangular costal spot. It is an easily-recognised species.

Pyralidina.

SICULODIDÆ.

STRIGLINA HYALOSPILA, *n. sp.*

Male, 36 mm. Head, palpi, and antennæ greyish-ochreous;

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thorax and abdomen reddish-ochreous, anteriorly broadly greyish-ochreous. Legs ochreous-grey. Forewings triangular, costa straight, arched towards apex, hindmargin slightly sinuate above and below middle; yellowish-ochreous, reddish-tinged, reticulated with numerous reddish strigulæ, obscure on basal half of wing, which is dull purplish-fuscous. This colour is continued along to apex, with a projecting tooth at about three-quarters; three transparent iridescent roundish spots in a transverse slightly oblique row, above inner margin at two-thirds, reaching half across wing, and rounded posteriorly by a patch of purplish-fuscous; a purplish-fuscous irregular patch just above middle of hindmargin; cilia yellowish, tinged with reddish-fuscous. Hindwings with hindmargin rounded; colour and cilia as in forewings, but reticulations more intense; a fuscous-purple apical blotch, extending along hindmargin to vein five; a purplish-fuscous transverse fascia from before middle of costa to before middle of inner-margin, contracted above middle, bounded posteriorly by three transverse rounded iridescent spots (transparent) placed in about middle of wing, and anteriorly bounded by two similar spots, longitudinally placed and more suffused; cilia as forewings.

One specimen taken in November at South Barnard Island (Coll. Barnard).

Tineina.

XYLORYCTIDÆ.

UZUCHA HYPOXANTHA, *n. sp.*

Female, 35 mm. Head, thorax, antennæ and palpi ashy-grey, abdomen and legs pale yellow, anterior legs somewhat infuscated, basal segment of abdomen with a narrow ferruginous band. Forewings elongate-oblong, costa very strongly and abruptly arched near base, thence tolerably straight, basal third with dense projecting hairs, apex obtuse, hindmargin obliquely rounded; ashy-grey whitish, the latter colour somewhat predominant; a large ill-defined roundish dark-fuscous blotch in middle of wing; cilia ashy-grey whitish, tips paler. Hindwings with hindmargin rounded; pale yellow; apex and hindmargin somewhat suffused with fuscous, most prominent at apex; cilia pale whitish-yellow, with a dark-grey basal line.

One specimen, Coomooboolaroo, Duaringa, Queensland, taken in November (Coll. Barnard), and one specimen taken at Chinchilla, Queensland, in December (in Brisbane Museum Coll.).

The hairs on the costa give the species a curious and distinct appearance; the species is undoubtedly referable to *Uzucha*, although vein 7 of forewing really terminates slightly above the apex.

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PILOSTIBES ENCHIDIAS, *Meyr.*

Dr. A. J. Turner, of Brisbane (who generously presented me with a pair), has bred this species from a species of *Eugenia (?)* found a few miles from Brisbane, Queensland. It has hitherto only been recorded from New South Wales.

CRYPTOPHAGA STOCHASTIS, *Meyr.*

I have received specimens from Oakleigh, Victoria, and Herberton, North Queensland. The types were from York, Western Australia.

CRYPTOPHAGA PROLEUCA, *Meyr.*

I have seen specimens taken at Kewell, Victoria.

CRYPTOPHAGA PORPHYRINELLA, *Walke.*

Vide post.

CRYPTOPHAGA ECCLESIASTIS, *Meyr.*

Mr. R. Illidge, of Brisbane, Queensland, has shown me the *male* of this species (which unfortunately got damaged). The colour of all wings is pale sooty-black, with an iridescent purplish sheen. The size is 37 mm. It has hitherto only been recorded from Victoria. Mr. Illidge's specimen was bred from trees growing adjacent to Brisbane.

CRYPTOPHAGA FLAVOLINEATA, *Walk.*

Both Dr. A. J. Turner and Mr. R. Illidge have bred this species from Eucalyptus growing in and around Brisbane. New South Wales is the only previously recorded locality.

CRYPTOPHAGA EPADELPHA, *Meyr.*

Mr. R. Illidge, of Brisbane, has bred this species rather commonly; the female was described by Mr. Meyrick (Trans. Roy. Soc. S.A., p. 36, 1890); the male is somewhat smaller, and differs only in having black hindwings and no hindmarginal spots except on forewings.

CRYPTOPHAGA BALTEATA, *Walk.*

I have seen specimens of this insect from both Sydney and Wimmera district, Victoria; it has not been hitherto recorded but from Mount Lofty, South Australia.

CRYPTOPHAGA STENOLEUCA, *n. sp.*

Male, 40 mm. Head and thorax fuscous; abdomen whitish, with ferruginous segmental rings, second segment broadly orange-red; antennæ and palpi yellowish-white; legs grey-whitish. Forewings moderately oblong, posterior slightly dilated. Costa straight, apex obtuse, hindmargin straight, with a slight sinuation beneath apex; fuscous, finely irrorated with black scales; a

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narrow whitish streak along costa from very near base almost to apex, attenuated at extremities; two very suffused and hardly traceable small dark-fuscous patches in centre of wing; two from near middle; cilia dark-fuscous, with a fine whitish line at base. Hindwings with hindmargin somewhat projecting at anal angle; snow-white, infuscated along hindmargin and apical half of wing; cilia snow-white, towards apex slightly infuscated.

One specimen, Duaringa, Queensland.

Nearest *irrorata*, Lew., but differs from that species by the white costal streak, besides being a more slender insect.

CRYPTOPHAGA CEPHALOCHRA, *n. sp.*

Female, 45 mm. Head and palpi ochreous-white, basal two-thirds of second joint fuscous externally. Thorax ashy-fuscous, anteriorly whitish-ochreous, edged posteriorly by a fuscous transverse line. Abdomen ochreous-fuscous. Legs dark bronzy-fuscous, posterior femora tinged with ochreous white. Forewings elongate-oblong, costa gently arched, hindmargin sinuate beneath apex, thence straight; dark-fuscous, mixed with ashy-grey; veins outlined with fuscous; a large suffused discal spot in middle of wing. A yellowish hindmarginal streak or line, dotted with fuscous. Cilia ashy-whitish, somewhat barred with fuscous. Hindwings with hindmargin rounded; dark-fuscous; 6 and 7 stalked; a narrow yellowish hindmarginal streak hardly reaching anal angle, broadest at apex; cilia greyish-fuscous, basal half dark-fuscous, with a fine white basal line.

One specimen taken at electric light (Central Railway Station), Brisbane, Queensland, in January, near the preceding, of which it may prove to be the female.

CRYPTOPHAGA PLATYPEDIMELA, *n. sp.*

Male, 42 mm. Head and palpi ochreous white. Antennæ white, pectinations yellow. Abdomen and legs ochreous-yellow, anterior tibiæ and tarsi fuscous. Thorax ochreous-white, with a large purplish-fuscous median blotch; patagia ochreous, with a purplish-fuscous patch. Forewings elongate-oblong. Costa nearly straight, hindmargin obliquely rounded; 2 from near middle ochreous white, sparsely strigulated with faint transverse purplish striga, a purplish-fuscous broad basal patch, its outer edge straight from one-sixth costa to one-sixth inner-margin, leaving a patch of ground-colour at extreme base; a large purplish-ferruginous discal spot beyond middle; a narrow irregularly dentate hindmarginal fascia broadest at apex; cilia dark-fuscous, with a well-defined whitish basal line. Hindwings with hindmargin rounded; 6 and 7 from a point; pale yellow; cilia pale yellow.

One specimen received Mr. R. E. Turner, Mackay, Queensland. It is a pretty and distinct species in the group of *albicosta*, Lew.

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CRYPTOPHAGA LURIDA, *Meyr.*, var. ASEMANTA, *Lower.*

Differs from the typical form in being without discal spots of forewings, otherwise precisely similar.

Three specimens from Sydney, N.S.W. (Coll. Melbourne Museum).

CRYPTOPHAGA MONOLEUCA, *n. sp.*

Female, 36 mm. Head, thorax, antennæ whitish, tinged with dull-purplish (palpi broken). Legs fuscous-whitish, abdomen whitish-ochreous. Forewings elongate, costa gently arched, apex hardly pointed, hindmargin rounded; dull chocolate, darker towards costa; a large quadrate white spot in disc, just before middle, preceded by a smaller obscure white spot; cilia whitish, towards base mixed with chocolate, especially at anal angle. Hindwings with hindmargin slightly sinuate beneath apex, thence rounded; greyish-fuscous, lighter towards base; cilia light greyish-fuscous, with a darker line near base.

One specimen from New South Wales (the precise locality not known) bred in February (Coll. Kershaw).

LICHENAULA UNDULATELLA, *Walk.*

Mr. R. Illidge has bred this species from pupæ taken near Brisbane. I have also taken two specimens at Mackay, Queensland, in November. Sydney, N.S. Wales, is the only previously recorded locality.

XYLORYCTA PORPHYRINELLA, *Walk.*

Cryptolechia porphyrinella, Walk., 771; *Cryptophaga porphyrinella*, Meyr., T. Roy. Soc., S.A., p. 32, 1890; *Lithosia bisecta*, Lucas.

Mr. R. Illidge having bred males of this species I am enabled to make the above correction. Meyrick was led into placing it in *Cryptophaga* through only possessing a female. Dr. Lucas has made the astonishing error of describing it as a new *Lithosia*.

XYLORYCTA EPIGRAMMA, *Meyr.*

Cryptophaga epigramma, Meyr., Tr. Roy. Soc., S.A., p. 31, 1890.

Mr. R. Illidge having bred the male of this species, I am able to place it in the correct genus. The Brisbane Museum possesses a curious and well-marked variety, posterior two-thirds of forewing occupied by a large white patch, which, however, does not reach the inner margin.

The specimen was taken at Albion, near Brisbane, in December.

XYLORYCTA HOMOLEUCA, *n. sp.*

Male, 31 mm. Head, palpi, antennæ, thorax, and abdomen

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white; very faintly tinged with ochreous, abdominal segments edged with dull-reddish, hardly perceptible. Legs light-fuscous. Forewings moderate, elongate; costa gently arched, apex obtuse, hindmargin obliquely rounded; shining white, faintly ochreous-tinged, without markings; cilia shining snow-white. Hindwings pale-grey; cilia as in forewings. Between *orectis*, Meyr., and *leucophanes*, Lower. From the former it differs in absence of orange costal edge, &c.; and from the latter by the absence of blackish costal edge, color of hindwings, and shape of forewings. The faint ochreous tinge is not very noticeable; veins four and five of the forewings are very closely approximated at base; the neuration is otherwise normal.

One specimen, "Coomooboolaroo," Queensland (Coll. Barnard).

XYLORYCTA SIGMOPHORA, *n. sp.*

Male, 35 mm. Head and thorax ashy-grey whitish; palpi, legs, abdomen, and antennæ same colour, antennal ciliations one and a half; abdomen with ferruginous segmental rings, anterior tibiæ and tarsi fuscous ringed and whitish; terminal joint of palpi infuscated. Forewings elongate-oblong, costa slightly arched, apex obtuse, hindmargin obliquely rounded; ashy-grey whitish, minutely irrorated with black; an obscure patch of blackish scales towards base; a blackish ω-shaped mark in middle of wing, followed by a small blackish suffusion; a hindmarginal row of confluent blackish dots, immediately followed by a whitish line on extreme hindmargin; cilia ashy-grey whitish, with a darker median line. Hindwings light fuscous; cilia grey-whitish, with a fuscous basal line.

Very like in general appearance species of *Agriophara*. It is not near any other known to me.

TELECRATES HELIOMACULA, *n. sp.*

Male, 27 mm. Head, palpi, and thorax yellow; anterior half of thorax dark purplish-fuscous; abdomen yellowish-orange, segmental margins broadly fuscous-purple, anal tuft orange. Legs yellow, anterior and posterior tibiæ and tarsi fuscous, middle femora infuscated. Antennæ fuscous, ciliations one-half. Forewings elongate-oblong, costa slightly arched at base, thence straight, apex rounded; hindmargin obliquely rounded; dark-fuscous, purple shining; markings yellow; an elongate spot immediately beneath costa at one-third; an irregular quadrate spot immediately beneath on inner margin before middle; a large irregular ovate spot just before apex, beneath which is a smaller spot suffused with three or four lines of ground colour; cilia dark-fuscous, with a darker basal line and a fine ochreous hindmarginal line. Hindwings orange-yellow; a narrow fuscous hindmarginal band, broadest at anal angle; cilia as in forewings.

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One specimen, Brisbane (Type in Brisbane Museum, Queensland). A very chaste and distinct species.

AGRIOPHARA CREMNOPIS, *n. sp.*

Male, 26 mm. Head and thorax black, abdomen fuscous-grey, antennæ blackish, ciliations grey, three. Legs grey, suffused somewhat with fuscous; all tibiæ and tarsi fuscous, tarsi with whitish apical rings. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; black, with two fine irregular, hardly perceptible, blacker lines, anteriorly edged with a few whitish scales; a row of black dots from below middle of costa, continued in a curve round to anal angle, anterior three edged anteriorly somewhat with whitish; a row of very small whitish dots on costa from middle to middle of hindmargin, obscured on hindmargin; cilia blackish-fuscous, with a few whitish points. Hindwings grey, suffused with pale fuscous posteriorly; cilia greyish.

Distinct by the black forewings. The markings are obscure unles examined in a side light.

One specimen, Duaringa, Queensland (Coll. Barnard).

ŒCOPHORIDÆ.

PALPARIA CALLIMORPHA, *n. sp.*

Male, 40 mm. Head, legs, antennæ, and thorax orange-yellow; palpi very long, ochreous-whitish, terminal joint fuscous, second joint with long hairs. Abdomen golden-fuscous. Forewings elongate-oblong, costa strongly arched; rosy carmine; extreme costal edge orange-yellow; a darker narrow carmine streak along fold from base to beyond middle; a fuscous-carmine discal spot, beyond which is a moderately broad blackish band-like suffusion curved to middle of inner margin at two-thirds. Space beyond this to hindmargin orange-yellow, except on costa; cilia orange mixed with fuscous (imperfect). Hindwings with hindmargin rounded; golden orange-yellow, cilia golden-yellow.

A fine and handsome species, closely allied to *lambertella*, Wing. I at first thought this might prove to be a variety of the last-mentioned, but in a long series (bred by Mr. G. Lyell. jun., of Gisborne, Victoria) I can find no specimen like it.

The one specimen known was taken at Cairns, Queensland, in September.

HOPLITICA EUGRAMMA, *n. sp.*

Male, 20 mm. Head and antennæ pinkish-grey, antennæ annulated with fuscous. Palpi pinkish, second joint white, apex grey. Abdomen bronzy, segmental margins yellowish-ochreous. Thorax pinkish-fuscous. Legs white, anterior tibiæ and tarsi

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carmine tinged, posterior pair and middle tibiæ and tarsi ochreous-yellowish. Forewings oblong, moderately broad. Costa arched towards base, apex obtuse, hindmargin obliquely rounded; flesh colour, minutely irrorated with deep pink scales, giving the appearance of being wholly pink; costal edge crimson throughout; extreme costal edge towards base whitish; a hardly perceptible minute blackish dot in disc before middle; a large very distinct blackish dot in disc at two-thirds; a roundish dark-fuscous suffusion on inner-margin at one-third; a similar spot, but more than twice as large as last, on inner-margin just before anal angle; a narrow hindmarginal streak, suffused and not reaching anal angle; cilia whitish-grey, mixed with pink, especially towards base. Hindwings light yellow; cilia greyish, becoming fuscous around apical half and anal angle.

One specimen, Duaringa, Queensland (Coll. Barnard), taken in September.

The large black spot on forewings is a well-marked character. In the present species vein of the forewings hardly terminates in the apex. Correctly speaking it is immediately below; therefore seemingly a *Helio causta*. The balance, however, is in favour of referring it to *Hoplitica*.

EOCHROIS POLYDESMA, *n. sp.*

Female, 25 mm. Head and palpi whitish, second joint of palpi externally fuscous. Legs whitish, tibiæ and tarsi somewhat infuscated. Thorax fuscous-whitish; antennæ fuscous. Forewings moderately broad. Costa gently arched, apex rounded, hindmargin almost straight; ashy-grey, irrorated with white and reddish-brown markings; a small ferruginous basal spot, anterior edge somewhat suffused, posterior edge darker and well defined, angulated above and below middle; a second similar but narrower fascia from costa near beyond this and parallel to it; a small irregular triangular spot of ground-colour on costa at two-thirds edged with white; immediately below this are two reddish-brown spots, one on each side; another similar above inner-margin at two-thirds, the three forming a triangle; a broad bright ferruginous fascia from before five-sixths costa attenuated to anal angle, anteriorly suffused with yellowish, posteriorly well defined, indented beneath costa and followed by a fine line of ground-colour; apical and hindmarginal area beyond this yellowish-ferruginous; an erect linear white streak immediately before anal angle, reaching about one-third across wing, edged anteriorly by a patch of darker ground-colour; cilia white mixed with greyish, at base tinged with ferruginous. Hindwings dark-fuscous; cilia fuscous, with a darker line near base. Wings beneath dark-fuscous. Forewings with a common costal streak from near base to near apex, broadest in middle.

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Type in National Museum, Melbourne, Victoria. The specimen was taken in New South Wales, probably near Sydney.

The markings of this species are as intricate as they are elaborate.

ZONOPETALA (?) ZYGOPHORA, *n. sp.*

Female, 15-18 mm. Head snow-white. Palpi snow-white; basal half of second joint fuscous, tinged externally. Antennæ and thorax dark-coppery-fuscous. Legs ochreous-yellow, slightly infuscated. Abdomen ochreous-fuscous. Forewings moderate; costa gently arched; apex round-pointed; hindmargin obliquely rounded, snow-white; a dark-fuscous basal patch just reaching inner-margin; a broad, reddish-fuscous fascia; anterior edge curved inwards, posterior edge straight from middle of costa to middle of inner-margin; a moderate reddish-fuscous (blackish at apex) hindmarginal fascia from apex to anal angle, from lower extremity of which proceeds a reddish-fuscous tooth to middle of median fascia; the ground colour between the last two fascia is tinged with yellow on costa; cilia yellow, mixed with fuscous, and with a darker parting line. Hindwings yellow, tinged with fuscous; cilia greyish-ochreous.

Two specimens Duaringa, Queensland, taken in January and February.

Nearest *decisana*, Walk., but markings less complex; the shape of wing is somewhat different from the other species.

EULECHRIA CEPHALOCHRYSA, *n. sp.*

Female, 23 mm. Head, palpi, and legs orange. Abdomen greyish-ochreous. Thorax shining snow-white. Forewings moderately elongate, rather narrow; costa slightly arched, apex somewhat pointed; hindmargin obliquely rounded, white, markings ochreous-fuscous; costal edge dull-orange throughout, except at base, which is fuscous; a spot on fold at one-fifth from base, another obliquely beyond, and slightly below it, suffusedly connected with a somewhat curved streak in middle of wing to two-thirds where it forms a sharp semicircular streak to anal angle; a suffused spot on apex; a narrow, suffused line along hindmargin; cilia ochreous-whitish, becoming greyish at apex and anal angle. Hindwings grey; cilia pale-yellowish.

One specimen Duaringa, Queensland (Coll. Barnard), taken in May.

Somewhat like a *Philobata*, being in form of wing like the male "*productella*," Walk. This, the present species, is referable to the *elæota* group.

SPHYRELATA DICHROA, *n. sp.*

Male, 13 mm. Female, 15 mm. Head and palpi snow-white;

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basal two-thirds of second joint of palpi golden-brown externally. Antennæ fuscous; basal joint white. Legs dark-fuscous, posterior pair ochreous-yellowish. Abdomen greyish-ochreous. Thorax golden-ochreous, posteriorly with a white spot. Forewings moderate; costa arched, apex round-pointed; hindmargin obliquely rounded, snow-white, markings golden-ochreous; a narrow basal spot, not reaching inner-margin; a broad, slightly-curved fascia dilated on inner-margin from before middle of costa to before middle of inner-margin; a strongly curved fascia from two-thirds of costa to anal angle; a similar fascia from just before apex, confluent at anal angle with previous streak, leaving a triangular spot of ground-colour on costa; a hindmarginal row of six or seven minute fuscous dots; cilia whitish, middle third yellowish, at anal angle with a fuscous tooth. Hindwings grey; cilia grey, ochreous-tinged at base towards apex.

One specimen, Duaringa, Queensland (Coll. Barnard), taken in May.

PILOPREPES LOPHOPTERA, *n. sp.*

Male, 21 mm. Head, thorax, and palpi white; second joint of palpi internally and externally fuscous-tinged. Legs and abdomen pale yellow, anterior legs pearly white, slightly infuscated. Antennæ fuscous. Forewings elongate, broadly dilated. Costa strongly arched, especially on basal half; apex rounded; hindmargin strongly rounded, white; a large patch of olive-green extending from base to near middle, posterior edge slightly curved from beyond one-third of costa to half of inner-margin, in the blotch are contained a suffused irregular patch of white, a narrow dentate milky-blue line proceeding from the white patch to inner-margin, and a small white basal spot; a suffused fuscous discal spot; a curved pale leaden fascia from middle of costa to above anal angle, anterior edge very suffused, posterior well defined, with an indentation in middle; a deep leaden patch near middle of hindmargin, hardly cut by veins of ground-colour; a smaller lighter spot above this; a leaden line along hind-margin and apical fourth of costa; cilia snow-white. Hindwings pale-yellow; cilia whitish ochreous.

One specimen beaten from *Eugenia myrtifolia* at Kedron Brook, near Brisbane, Queensland, in October. Intermediate in form between *anassa*, Meyrick, and *aristocratica*, Meyrick.

TRACHYPEPLA CALLIDESMA, *n. sp.*

Male, 17; female, 19 mm. Head and palpi white, palpi mixed with fuscous externally, especially at apex of basal joint. Antennæ fuscous, annulated with dark-fuscous, ciliations one and a-half. Legs fuscous, posterior pair grey-whitish. Abdomen yellowish-ochreous; thorax grey-whitish. Forewings moderate.

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Costa gently arched, apex round pointed, hindmargin obliquely rounded; greyish-ochreous, suffusedly irrrorated with dark-fuscous, some white scales towards base mixed with black, two tufts of ochreous scales placed one above the other at one-third from base, edged on upper portion by a blackish streak; two black dots, longitudinally placed in middle of wing, separated by three small snow-white dots; immediately above the posterior white dot is an ochreous spot, finely edged with black, and below this is a large tuft of scales, snow-white anteriorly and yellowish posteriorly; a strongly-curved black line almost from black-edged spot to anal angle; an irregular black suffused apical patch; three small white dots below this on hindmargin; cilia greyish-ochreous, with a suffused black median line not reaching anal angle. Hindwings ochreous-grey, at base lighter; cilia greyish ochreous.

Two specimens taken in January by Mr. G. Barnard at Win dermere, Tasmania. The second Australian species, easily known from *melanoptila*, Mey., by the white head, and tufts not being black, &c.

PHILOBOTA ISOSCELIPHORA, *n. sp.*

Male and female, 25 mm. Head deep yellow. Thorax and antennæ purple-fuscous, palpi fuscous, termimal joint yellowish. Legs pale-yellowish, anterior pair fuscous; abdomen yellowish, sometimes dark-fuscous. Forewings elongate moderate, costa gently arched, apex rounded, hindmargin slightly sinuate, oblique; bright yellow; markings dark purple-fuscous; a narrow basal fascia, curved outwards and continued to one-fourth along costa; an erect triangular patch on inner-margin near anal angle reaching nearly half across wing; a moderate fascia along hind-margin anteriorly curved outwards; cilia dark-fuscous. Hind-wings dark bronze-fuscous, paler towards base; cilia dark-fuscous.

Two specimens, Duaringa, Queensland, in October. Allied to *fascialis*, Fab., of which it may ultimately prove a variety.

PELTOPHORA PSAMMOCHROA, *n. sp.*

Male, 34 mm. Head, thorax, palpi, and antennæ greyish-ochreous; palpi long, thorax narrowly dark fuscous anteriorly, second joint of palpi fuscous towards apex, apical half of terminal joint whitish. Antennal ciliations three, abdomen greyish-ochreous, mixed with rufous on base of segments. Legs greyish-ochreous, anterior pair infuscated, tibiæ and tarsi fuscous with whitish apical rings. Forewings elongate, dilated posteriorly; costa gently arched, hindmargin obliquely rounded; greyish-ochreous, with minute scattered blackish scales; a black streak along basal one-eighth of costa; a similar streak along basal one sixth of inner margin, and a black dot between, the three form-

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ing a disconnected fascia; a black dot in the disc at about one-third, another slightly beyond and below on fold; a third beyond the first; a curved mark in disc at two-thirds, sometimes divided into three dots; a transverse curved line from five-sixths of costa to anal angle, indented beneath costa, a hindmarginal row of black dots; cilia greyish fuscous. Hindwings fuscous-grey; cilia grey-whitish, mixed with fuscous scales.

Allied to "*privatella*," Walk., but separable by darker ground-colour, markings at base, and hindmarginal dots.

Two specimens, Duaringa, and two Brisbane, Qneensland, in December.

PELTOPHORA PANXANTHA, *n. sp.*

Female, 25 mm. Head and palpi yellow. Thorax yellow, anterior half and shoulders deep purple. Terminal joint of palpi and second joint externally fuscous. Antennæ yellowish; basal joint fuscous-purple. Legs pale yellowish-white. Forewings moderate; costa gently arched; hindmargin obliquely rounded; deep-yellow, deepest posteriorly; a minute purplish spot at base of costa; cilia yellow. Hindwings light fuscous; cilia grey-whitish, with a darker basal line.

Coomooboolaroo Ranges. Duaringa, Queensland, in October.

Its nearest ally is "*coniortia*," Meyr., but it is easily separated from that species by the thorax, &c.

PELTOPHORA HOLOCYCLA, *n. sp.*

Female, 24 mm. Head and abdomen yellow. Palpi ochreous-yellow; basal two-thirds of second joint externally tinged with fuscous. Thorax dull purplish-fuscous, with a white, quadrate central spot. Legs ochreous-yellow, anterior pair infuscated. Antennæ fuscous. Forewings elongate, moderately broad; costa gently arched, apex rounded; hindmargin obliquely rounded, snow-white, slightly shining; markings dark-fuscous, a narrow spot in middle of wing at one-sixth from base; a straight, moderate fascia, running obliquely from one-third of costa to one-half inner-margin; a large circular ring (somewhat elliptical) above anal, and connected with costa by a short wedge-shaped spot at three-fourths; a curved, narrow fascia along upper two-thirds of hindmargin; cilia whitish, tinged with yellow, especially round anal angle. Hindwings pale-ochreous; cilia ochreous-yellow, darker at base.

Allied to *mychias*, Meyr., but quite different in markings.

One specimen, Stawell, Victoria, from Mr. F. Spry.

PELTOPHORA EUGRAMMA, *n. sp.*

Male, 25 mm. Head ochreous-white. Palpi, thorax, legs, and antennæ dark-fuscous, posterior legs and palpi externally ochreous.

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antennal ciliations 5. Abdomen ochreous. Forewings elongate, dilated posteriorly, costa gently arched, apex round-pointed, hindmargin obliquely rounded; pale whitish-ochreous; a thick blackish streak along costa from base to middle, attenuated posteriorly; a nearly straight, irregularly edged blackish fascia from posterior end of costal streak to inner-margin before middle, thicker on lower half; a thick curved blackish fascia from five-sixths of costa to anal angle, projecting inwards above middle, from which projection proceeds a semicircular thick tooth, narrowed above and ending above anal angle; a dentate moderately thick blackish hindmarginal line, joining last-mentioned fascia on costa and anal angle, space between as ground-colour, separated by fine lines of a blackish colour on lower half; cilia yellow, at and below apex dark-fuscous. Hindwings bright yellow; apex suffused with fuscous; cilia yellow, round apex fuscous.

One specimen from Springvale, Victoria. Exceptionally distinct and handsome.

PLEUROTA STENODESMA, *n. sp.*

Female, 16 mm. Head, thorax, palpi, antennæ and legs ashy-grey whitish, basal joint of antennæ and second joint of palpi internally and laterally fuscous. Abdomen greyish. Forewings elongate, dilated posteriorly, costa gently arched, apex rounded, hindmargin oblique; ashy-grey whitish; all veins finely and neatly outlined in blackish; a fine blackish line from base above middle to end of cell; a more distinct similar line from base along fold to beyond two-thirds; space above this clear white, continued to hindmargin below apex, but cut by a fine line of black beyond end of cell; cilia ashy-grey whitish. Hindwings and cilia greyish, cilia with a darker line at base.

One specimen taken at Highbury, South Australia, in December. The markings of this species are not unlike that of *Semnoceros crambella*, one of the *Depressariadæ*.

CÆSYRA EUCHRYSA, *n. sp.*

Male, 15 mm; female, 17 mm. Head yellow, palpi and antennæ pale-yellow, palpi externally fuscous, antennæ annulated with fuscous. Legs fuscous, posterior pair ochreous-yellowish, abdomen greyish-fuscous; thorax purple-fuscous. Forewings elongate, moderate, costa gently arched, hindmargin oblique, slightly sinuate beneath apex; bright yellow; a dark-fuscous narrow basal patch reaching both margins, shortly continued along costa; a bright reddish-purple hindmarginal band, bounded by a blackish sinuate line from four-fifths costa to before three-fourths inner-margin; in one specimen the band contains a yellow spot of ground-colour and four small spots of same colour along hindmargin, and sometimes the median portion of the band is

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suffused ochreous or ochreous-fuscous patches; cilia purplish-fuscous. Hindwings bronzy-grey, somewhat ochreous-tinged; cilia greyish-ochreous, with an indistinct darker line. Near *paracycla*, Mey., and *concisella*, Walk., but it differs from the latter in having the thorax wholly black and basal fascia, and from the former by thorax and shape of wing. It is not unlike *Chrysoryctis xystidophora*, Meyr. (Tineidæ).

Two specimens, Duaringa, Queensland, in September and December.

CÆSYRA HELIOPHANES, *n. sp.*

Male, 17 mm. Head and palpi yellow, second joint of palpi infuscated externally, except towards apex. Thorax, shoulders and abdomen dark purple-fuscous, antennæ fuscous, ciliations nearly 2, abdomen yellow beneath. Legs dark-fuscous, post pair yellowish. Forewings moderate, costa gently arched, apex rounded, hindmargin obliquely rounded; shining deep yellow, with purple-fuscous markings; a basal patch from costa to inner-margin, continued along costa to one-half, attenuated posteriorly; a broad hindmarginal band, occupying more than apical third of wing, from costa at about two-thirds to inner-margin before one-third. Cilia blackish-fuscous, purplish tinged. Hindwings and cilia bronzy-fuscous, becoming fuscous round apex.

Two specimens, Duaringa, Queensland, in August (Coll. Barnard).

CÆSYRA OPSIPHANES, *n. sp.*

Male, 18 mm. Head and palpi yellow. Thorax and abdomen purplish-fuscous. Legs fuscous, posterior pair ochreous-yellowish, anterior and middle pair with yellowish tarsal rings; antennæ fuscous. Ciliations 1½. Forewings moderate; costa gently arched; apex rounded, hindmargin obliquely rounded; deep shining yellow, markings fuscous-purple, in some lights shining purple; a narrow basal fascia reaching both margins, continued along costa to beyond half, attenuated posteriorly; a broad hindmarginal band from two-thirds costa to beyond inner-margin, and containing two wedgeshaped spots of ground-colour, one on costa and one on inner-margin, which is suffused; cilia dark-fuscous, with a few yellow points. Hindwings and cilia dark bronzy-fuscous; cilia yellowish at base. Allied to the two preceding. The purple is very resplendent in some lights.

Two specimens at Duaringa, Queensland, in February.

CÆSYRA HETEROZONA, *n. sp.*

Male, 13; female, 15 mm. Head and palpi deep yellow, basal half of second joint purplish-fuscous. Legs fuscous, posterior pair yellowish-ochreous. Thorax deep purple-fuscous, collar narrowly yellow, abdomen and antennæ fuscous. Antennal ciliations 1.

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Forewings moderate, dilated posteriorly; costa somewhat arched, apex rounded, hindmargin obliquely rounded; deep yellow, markings fuscous-purple; a narrow basal fascia; a strongly curved (in some specimens nearly straight), rather thick transverse fascia from two-thirds of costa to anal angle, continued narrowly along costa to apex; cilia yellow, in some specimens tinged with fuscous. Hindwings and cilia light greyish-fuscous, cilia becoming ochreous at apex, and with an indistinct fuscous line. In the "*ocellaris*" group; it resembles very much *Brachynemata cingulata*, Mey., but is larger, and the antennæ are different.

Five specimens (Coll. Barnard) taken near Duaringa, Queensland, in September.

CÆSYRA OCHROCHOA, *n. sp.*

Male and female, 17 mm. Head, thorax, and palpi light yellow, slightly shining; palpi whitish internally, slightly fuscous externally. Antennæ, abdomen, and legs fuscous; posterior legs whitish. Forewings elongate, dilated posteriorly; costa gently arched, apex rounded, hindmargin obliquely rounded; shining yellow, costal edge towards base blackish; a very indistinct light fuscous spot above anal angle; cilia pale yellow. Hindwings light-fuscous; cilia light-grey, with a darker basal line.

Three specimens from Gisborne, Victoria, sent by Mr. G. Lyell, jun., taken in October.

OCYSTOLA OXYPTERA, *n. sp.*

Male, 17 mm. Head and thorax yellow, posterior half of thorax purplish-fuscous, shoulders purplish; abdomen, antennæ, and legs dark-fuscous; antennal ciliations $1\frac{1}{2}$; palpi fuscous, internally yellowish. Forewings elongate, moderate; costa gently arched, apex acute, hindmargin sinuate beneath apex, thence obliquely rounded; deep golden yellow; a narrow blackish costal streak from base, where it expands into a spot to fascia; a purplish fuscous hindmarginal band occupying apical half of wing, anteriorly edged by a dentate black line from before three-fifths costa to middle of inner-margin; cilia reddish-ochreous, at apex and round anal angle blackish. Hindwings and cilia blackish.

One specimen from Stawell, Victoria, bred from a portable case found on *Templetonia retusa* in December.

GUESTIA PELADELPHA, *n. sp.*

Male and female, 25 mm. Head, thorax, palpi, and antennæ brownish-ochreous, palpi externally grey. Legs light-fuscous, tibiæ ringed suffusedly with white, posterior legs greyish-ochreous; abdomen greyish-ochreous. Forewings elongate-oblong, dilated posteriorly; dull brownish-ochreous; a black, well

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defined streak from base along fold to one-fourth; a narrow linear black mark above and beyond this; a small blackish suffused mark at end of cell; a hindmarginal row of blackish dots continued along apical fourth of costa, preceded by a similar but very faint row of dots; cilia pinkish-ochreous. Hindwings and cilia grey.

Three specimens taken in July at Parkside, South Australia.

It is essentially a winter species, being taken only in July, and then rarely. I have captured three species in as many years, usually at light.

ŒCOPHORA PENTOCHRA, *n. sp.*

Female, 10 mm. Head and palpi ochreous-white; second joint fuscous at base. Antennæ and legs dark-fuscous. Tibiæ and tarsi ringed with whitish. Abdomen greyish. Forewings blackish-fuscous, with ochreous-white markings; a small spot at base of wing; a broad fascia from one-fourth of costa to one-fourth inner margin, edges irregular; a similar fascia, more oblique, from one-half of costa to before anal angle; two quadrate spots, one at costa at three-quarters, and one on inner margin obliquely below. A similar spot on costa at apex. Cilia ochreous-whitish, at base blackish-tinged. Hindwings and cilia grey-whitish, tinged with fuscous at apex.

One specimen at Eucla, West Australia, in December.

MACROBATHRA MICROPIS, *n. sp.*

Male, 19; female, 21 mm. Head whitish-ochreous. Antennæ and palpi blackish; basal two thirds of second joint of palpi whitish-ochreous. Thorax whitish-ochreous, suffused with fuscous, anterior half black. Legs blackish, banded with white. Abdomen fuscous. Forewings elongate-lanceolate, black, markings whitish-ochreous; a moderate fascia, suffused with fuscous from one-fifth costa to one-third inner margin, much dilated on inner margin, constricted in middle; a roundish spot on middle of costa, and one opposite on inner margin, suffused with fuscous, and ill-defined; a sub-quadrate spot (larger than that on middle of costa) on costa at four-fifths; a small spot on anal angle; cilia blackish, on costal spot ochreous-white, on anal angle whitish-ochreous. Hindwings bronzy-fuscous; cilia grey, darker at apex. A neatly-marked species, somewhat like "*ceraunobola*," Mey.

Two specimens Coomooboolaroo Range, Duaringa, Queensland (Coll. Barnard).

MACROBATHRA HETEROCERA, *n. sp.*

Female, 19 mm. Head and palpi ochreous-white; base of second joint and apex of terminal fuscous externally. Antennæ dark-fuscous. Legs dark-fuscous, suffusedly banded with whitish-

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ochreous. Abdomen yellowish-ochreous. Thorax dark purple-fuscous, suffused with whitish. Forewings elongate-lanceolate, shining dark bronzy-fuscous; markings white; a moderate fascia from one-fifth costa to one-fourth inner-margin, but not nearly reaching it, posterior edge with a small indentation above; a narrower fascia from middle of costa to middle of inner-margin, but not reaching it, narrowed on costa and towards inner-margin, and with an indentation on each side, giving the appearance roughly of a figure 8; a wedge-shaped spot on costa about three-fifths, and a smaller round one on anal angle; cilia dark-fuscous, with a white, wedge-shaped spot at apex, and a small, whitish spot at anal angle. Hindwings light-fuscous, with a white, wedge-shaped spot at apex, and a small, whitish spot at anal angle. Hindwings light-fuscous; cilia greyish-fuscous.

Not very near any other. The whitish head is very conspicuous; the second fascia is, no doubt, formed by the confluence of the two median spots. In other specimens they may separate, for which allowance should be made.

One specimen taken at "Billopp," Tasmania, by Mr. G. Barnard in December.

MACROBATHRA DASYPLACA, *n. sp.*

Male, 17 mm. Head fuscous, mixed with whitish; palpi yellow-ochreous, terminal joint externally infuscated. Antennæ and abdomen fuscous, antennæ finely annulated with yellowish. Legs fuscous, posterior pair yellowish-ochreous. Thorax yellowish-ochreous, with a large, fuscous anterior, quadrate spot. Forewings elongate-lanceolate, yellow; a moderate blackish basal fascia, posterior edge curved inwards; an irregular, blackish suffusion along inner margin, continued suffusedly to anal angle, anterior edge almost touching base of fascia; from anterior portion of this fascia proceeds a fine line, which gradually expands along dorsal portion of wing until it forms an elongate diamond-shaped patch, posterior portion touching middle of hindmargin, and leaving costa clear throughout, except basal fascia; cilia yellowish, mixed with grey, beneath anal angle yellow. Hindwings dark-fuscous; costal cilia yellow, remainder greyish-fuscous.

Rather an abnormal-looking species as regards markings. Between "*euryxantha*," Meyr., and "*Chrysotoxa*," Meyr.

One specimen taken in March at Windermere, Tasmania, by Mr. G. Barnard.

MACROBATHRA ASEMANTA, *n. sp.*

Female, 20 mm. Head, abdomen, and palpi pale yellowish-ochreous; terminal joint fuscous, antennæ fuscous, annulated with yellow. Thorax yellowish-ochreous, with an anterior quadrate

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fuscous patch. Legs fuscous, tibiæ and tarsi banded with yellowish, posterior pair yellowish-ochreous. Forewings elongate-lanceolate; pale yellowish-ochreous, markings dull fuscous-purplish, a small spot on base of costa; a moderately broad fascia, anteriorly edged with blackish, from about three-fourths of costa to just before anal angle, anterior edge with a slight indentation, posterior edge straight and dilated on inner margin, central portion paler; a narrow wedgeshaped hindmarginal band, not touching fascia, enclosed space as ground-colour; cilia fuscous, on middle of hindmargin yellowish. Hindwings bronzy-fuscous, cilia fuscous, paler towards base.

One specimen, Windermere, Tasmania, in January, taken by Mr. Geo. Barnard. This species is not unlike a *Cæsyra*. The absence of the first fascia, which is only represented by a dot, is a well-marked character.

MACROBATHRA GONOLOMA, *n. sp.*

Male, 17 mm. Head dark-fuscous, palpi, abdomen, and thorax yellow; terminal joint of palpi fuscous-tinged, thorax with a narrow collar of purplish-fuscous, antennæ fuscous annulated with yellow. Legs dark-fuscous, tibiæ and tarsi suffusedly banded with yellow, posterior legs yellowish-ochreous. Forewings elongate-lanceolate; yellow; a broad purple-blackish basal patch, posterior edge curved outwards from one-sixth of costa to one-sixth inner-margin, apical two-fifths of wing occupied by a patch of reddish-fuscous, anterior edge somewhat blackish, curved inwards on upper half and outwards on lower half; cilia greyish-fuscous, at anal angle yellowish tinged. Hindwings dark-fuscous, becoming blackish towards base; cilia greyish, becoming yellow at base and on costa. Nearest "*euryxantha*," Meyr., but the shape and arrangement of the fascia and band are conspicuously distinct.

Two specimens, Duaringa, Queensland, in April (Coll. Barnard).

MACROBATHRA DIPLOCHRYSA, *n. sp.*

Female, 16 mm. Head, palpi, thorax, antennæ, and legs blackish-fuscous, tip of terminal joint of palpi ochreous-white, second joint roughened with scales, tibiæ and tarsi ringed with ochreous-whitish, abdomen ochreous, mixed with black. Forewings elongate, moderately broad, apex somewhat pointed, blackish-fuscous; a broad black fascia from one-third costa to one-third inner margin, broadest on costa, and edged anteriorly by its equal width of reddish-brown; a small reddish spot on middle of inner-margin, edged above with black, and surmounted on costa by an ochreous white dot; a larger ochreous white dot on costa at three-fourths, and a smaller one beneath on anal angle, both irregularly edged with black; cilia blackish-fuscous.

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Hindwings dark-fuscous, becoming ochreous at base; cilia dark-fuscous, at base ochreous.

Five specimens received from Mr. R. Illidge, taken at Brisbane, Queensland. It is near *ceraunobola*, Meyr.

GLYPHIPTERYGIDÆ.

Eupselia holoxantha, *n. sp.*

Male, 15 mm. Head, palpi, legs and antennæ fuscous. Thorax silver-grey, broadly dark-fuscous posteriorly, patagia silver-grey. Forewings with costa nearly straight, apex round-pointed, hindmargin slightly sinuate beneath apex; silver-grey, with a few fine obscure strigulæ; a dark chocolate triangular patch on innermargin at one-third reaching more than half across wing, anterior edge well defined, posterior somewhat suffused; a large suffused chocolate patch, occupying apical third of wing; a suffused spot of chocolate at apex, separated from preceding by a suffused line of ground-colour; a snow-white discal spot on anterior edge of large apical patch; cilia chocolate, with three darker lines. Hindwings light-yellow; hindmargin narrowly blackish; cilia blackish.

One specimen, Parkside, South Australia, on a fence during a high wind. Differs from the other described species by the narrow hindmarginal line of hindwings, besides other points.

GELECHIADÆ.

Gelechia strophiopeda, *n. sp.*

Male, 11 mm. Head, palpi and thorax ochreous, palpi tinged with fuscous, thorax with a narrow anterior fuscous band. Legs fuscous, posterior pair ochreous white, abdomen greyish, posteriorly blackish. Forewings elongate, moderate. Costa hardly arched, apex obtuse, hindmargin obliquely rounded; pale-ochreous; markings dark-fuscous; a narrow fascia from base of costa to one-fourth inner-margin; three small spots in a line; costal largest, from before one-third of costa to inner-margin at one-fourth, and meeting a suffusion from preceding fascia; a moderate fascia from just before three-fourths of costa to anal angle, dilated on costa and anal angle; a small suffused apical spot reaching nearly half across wing; some scattered fuscous scales beneath this; cilia ochreous, tinged with fuscous. Hindwings grey; cilia grey, at base yellowish.

One specimen from Melbourne, Victoria.

Gelechia anthracephala, *n. sp.*

Female, 15 mm. Head and palpi black, antennæ black, thorax white. Legs blackish, posterior pair whitish, abdomen greyish.

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Forewings elongate, moderate, costa hardly arched, apex pointed, hindmargin very oblique; blackish-fuscous, with white markings; a moderately large roundish basal spot, separated from costa by a streak of ground colour; a broad irregularly-edged whitish fascia, anterior edge curved inwards, posterior edge with a slight projection below middle, occupying median third of wing; a tooth-like patch on hindmargin immediately below apex; a minute white spot on costa at five-sixths; cilia fuscous, on tooth white, at apex black. Hindwings fuscous; cilia greyish, becoming ochreous-whitish at base.

One specimen, Sydney, New South Wales, from Mr. Froggatt. The markings of this species are well defined.

GELECHIA MICROSPILOPLACA, *n. sp.*

Male, 14 mm. Head, palpi, antennæ and thorax blackish, palpi externally mixed with whitish, apex of second joint and apex of terminal joint whitish. Legs dark fuscous, mixed with ochreous-white. Forewings moderately broad, somewhat dilated posteriorly; black; a broad ochreous-white fascia, anterior edge slightly sinuate inwards in middle from one-third costa to one-third inner-margin, posterior edge from about middle of costa to middle of inner-margin, suffused and having two black dots on edge above middle; within this patch or fascia is a small yet distinct black dot placed near posterior edge; an ochreous white streak from costa at three-fourths to hindmargin above anal angle, angulated inwards in middle so as to almost touch preceding fascia; a fine whitish hindmarginal line, not reaching costa; cilia fuscous, at base black. Hindwings and cilia light-fuscous, lighter towards base.

One specimen, Sydney, New South Wales. Allied to the preceding; the black dot on the fascia is very noticeable, and indicates the species with certainty.

GELECHIA EPIMELA, *n. sp.*

Male, 13 mm. Head, palpi, thorax, palpi and antennæ fuscous-white, thorax with an anterior black transverse band broadest in middle. Legs fuscous-white, posterior pair broadly banded with black. Abdomen fuscous. Forewings moderate, elongate, costa hardly arched, apex round-pointed, hindmargin obliquely rounded; fuscous grey-whitish; markings black; a strongly-curved fascia from base of costa to inner margin at one-fourth, broadest on costa; two broad irregular quadrate spots on costa at one-third and two-thirds respectively, reaching half across wing, and converging to meet at base, leaving a small triangular spot of ground-colour on costa; an apical streak reaching second spot at base; cilia fuscous grey-whitish. Hindwings and cilia fuscous.

One specimen, Brisbane, in December.

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GELECHIA NANA, *n. sp.*

Male, 13 mm. Head smooth, whitish; palpi and thorax pale-brownish ochreous, second joint of palpi whitish externally, apex of terminal joint with a blackish ring. Legs and abdomen greyish. Antennæ fuscous. Forewings elongate, slightly dilated posteriorly; ochreous-brown, a large irregular-cordate reddish spot at one-third from base, finely edged with black, its apex directed towards anal angle; seven fuscous spots on costa at about equal distances, three before middle, and four beyond smaller; a larger spot on fold immediately below first costal spot; a very fine blackish lunate mark, sometimes separated into two dots beneath fourth costal spot; a suffused fuscous dot-like hindmarginal line; a suffused whitish patch immediately above anal angle; cilia grey, basal half reddish-ochreous. Hindwings greyish-fuscous; cilia greyish, at base darker.

GELECHIA HÆMASPILA, *n. sp.*

Male, 14 mm. Head, thorax, legs, palpi, and abdomen greyish-ochreous; anterior legs fuscous, with whitish tarsal rings; terminal joint of palpi with suffused blackish rings above and below middle. Antennæ light-fuscous, annulated with whitish. Forewings shaped as in "*nana*," pale-ochreous; six quadrate, small fuscous spots on costa, two before middle, four beyond middle; two large reddish-fuscous spots edged with whitish, one at one-third in middle of wing, the other at two-thirds somewhat smaller; some fuscous scales towards apex and at base; cilia ochreous, tinged with fuscous. Hindwings light greyish-fuscous; cilia greyish-ochreous.

One specimen at light, Parkside, S.A., March 22, 1890. Closely related to the preceding, but differently marked.

GELECHIA MESOCHRA, *n. sp.*

Male, 12 mm. Head and palpi ochreous-white. Legs greyish. Antennæ and thorax fuscous (abdomen broken). Forewings elongate-linear, apex pointed; whitish-ochreous; a blackish streak along costa from base to near apex, attenuated anteriorly; a much thicker irregularly-edged streak along inner margin from base to anal angle, and continued suffusedly along hindmargin to apex, where it almost touches costal streak; cilia grey. Hindwings and cilia grey.

One specimen at Parkside, South Australia, in March, allied to *stratifera*, Meyr., but smaller, and with a costal streak.

CLEODORA MELIPHANES, *n. sp.*

Male, 11 mm. Head, thorax, palpi, antennæ, and legs pale whitish-yellow. Head more whitish posteriorly. Forewings

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elongate, moderate, costa gently arched, apex pointed, hindmargin obliquely rounded; palpi whitish-yellow; cilia pale whitish-yellow; at apex with a well-marked ferruginous patch. Hindwings grey; cilia ochreous-grey.

One specimen at Blackwood, S. Australia, in November.

POGONIAS (?) HELIODORA, *n. sp.*

Female, 12 mm. Head, palpi, legs, and thorax light ochreous-yellow; second joint of palpi with three narrow, black, apical rings; terminal joint with some scattered black scales; thorax with a large, suffused, blackish central blotch. Antennæ yellowish, annulated with black, especially beyond middle. Abdomen orange, anal segment somewhat blackish, posterior legs with tarsal rings of blackish. Forewings elongate-linear, ochreous-yellow, or clay colour, with six tufts of blackish scales, arranged as follows: three in an oblique row from about one-third costa to above one-fourth inner-margin; two much larger on inner margin (one at anal angle and one immediately before), and one small above last, but nearly on costa. All these spots appear anteriorly metallic when held in certain lights; the ground-colour is darker at one-third, and at and towards apex; an obscure white spot on costa near apex; a narrow streak of whitish around apex; cilia dark-fuscous. Hindwing elongate-lanceolate, dark-fuscous; cilia dark-fuscous, at base lighter.

A curious species. The tufts have a curious effect when held in different lights, appearing alternately colourless, iridescent, or black.

I took a single specimen at Duaringa, Queensland, in November, amongst grass.

POGONIAS (?) TRISSODESMA, *n. sp.*

Female, 15 mm. Head white; palpi black, second joint white, apex of terminal joint white. Thorax purplish-black. Antennæ and legs purplish-black. Tibiæ and tarsi ringed with white. Abdomen ochreous-whitish. Forewings rather narrow, elongate-lanceolate, purplish-black; three narrow, irregular, white fascia, first from one-fifth costa to fold, thence gently curved towards centre of wing, but not reaching it; second from middle of costa to middle of inner-margin, dilated in middle, and finely narrowed on lower half; third from five-sixths costa to just before anal angle, broadest on costa, and dot-like above anal angle; a minute white dot beyond second fascia, and two similar, one above the other, beyond first fascia; cilia light-greyish at apex, dark-fuscous on basal half. Hindwings and cilia fuscous.

A beautiful species, recalling a *Macrobathra* in general appearance. The second joint of palpi is somewhat tufted.

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One specimen received from Gisborne, Victoria, taken by Mr G. Lyell, jun.

POGONIAS HELIOTRICHA, *n. sp.*

Female, 17 mm. Head, palpi, antennæ and thorax blackish fuscous, sparsely dusted with white, apex of second joint whitish thorax with two narrow lines of white, starting anteriorly and meeting posteriorly in middle (abdomen broken). Legs fuscous-whitish. Forewings elongate-linear, apex pointed; blackish fuscous, with darker small tufts of scattered scales; costa and inner-margin obscurely edged with whitish; cilia dark-fuscous. Hindwings elongate-lanceolate; blackish; cilia bright yellow-ochreous, terminal portion and round apex and anal angle dark-fuscous.

One specimen received by Mr. G. Lyell, jun. The yellow cilia of the hindwings is a very definite character.

POGONIAS CAPNOPA, *n. sp.*

Female, 19 mm. Head, palpi, antennæ and thorax black, second joint of palpi dense and spreading. Legs black, hairs grey. Forewings elongate-linear, apex pointed; black, with scattered tufts of blacker scales; cilia greyish, blackish tinged. Hindwings elongate-lanceolate; blackish; cilia as in forewings.

This unicolorous black species is immediately known by the absence of markings.

One specimen received from Mr. G. Lyell, jun., of Gisborne, Victoria.

POGONIAS PORPHYRESCENS, *n. sp.*

Male and female, 11-14 mm. Head, palpi, antennæ, legs, thorax and abdomen, abdomen with narrow white segmental rings, palpi, legs and abdomen beneath white. Forewings elongate-lanceolate; purplish-black, tufts same colour, apex and middle third of wing finely and obscurely dusted with whitish; cilia dark-fuscous. Hindwings narrow, linear; cilia blackish.

Parkside, South Australia, also Belair, South Australia, in December. Two specimens.

TINEIDÆ.

BLABOPHANES (?) HETEROGAMA, *n. sp.*

Male, 12 mm.; female, 18 mm. Head, thorax, and antennæ whitish, tinged with flesh-colour; head densely hairy; abdomen yellow-ochreous in male, greyish in female. Legs fuscous, in male posterior pair pale-yellow. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; dark-fuscous; a thick whitish streak along inner-margin from base to anal angle, and continued to middle of hindmargin, indented

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above hindmargin; the two indentations cause two sharp angulations of ground-colour; cilia whitish-fuscous, with a blackish suffused hindmarginal line. Hindwings in male yellow, in female grey; apices in both sexes infuscated in male, continued narrowly along hindmargin; cilia in male fuscous, in female grey, tinged with fuscous at base.

One pair taken *(in cop)* at Coomooboolaroo, Duaringa, Queensland, in October (Coll. Barnard). This species may not be a true *Blabophanes*. At the time of describing the species I had not the characters of the genus, and consequently relied on memory, which, however, I do not think is in error.

MIMOSCOPA OPSIPHANES, *n. sp.*

Female, 23 mm. Head rough, whitish, mixed with light-fuscous. Thorax white, patagiæ fuscous, abdomen greyish; palpi, antennæ, and legs grey-whitish; anterior legs fuscous. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; pale brownish-ochreous, with numerous suffused blackish, fine longitudinal lines; extreme costal edge white from near base to near apex, most prominent in middle; a moderately broad white longitudinal median streak from base to apex, with a fine line of ground-colour, becoming bifurcate beyond middle, and continued nearly to apex; a small black dot on lower portion of white streak at two-thirds; cilia grey-whitish, becoming fuscous at base and round apex; hindwings and cilia grey-whitish, becoming fuscous-tinged at apex.

Two specimens beaten from *Casuarina quadrivalvis* at Blackwood, South Australia, in April. Probably feeds on above-named tree. The markings are (as Mr. Meyrick points out) very similar to some species of *Xyloryctidæ*, e.g., *Catoryctis tricrena*, Meyr.

PLUTELLIDÆ.

TRITYMBA XANTHOCOMA, *n. sp.*

Male, 20 mm. Head, palpi, antennæ, legs, and thorax dark fuscous. Abdomen yellow. Forewings elongate-lanceolate, moderately broad; dark bronzy-fuscous, shining; cilia bronzy-fuscous, lighter at base. Hindwings dark bronzy-fuscous; cilia bright yellow, at and around apex and hindmargin dark-fuscous.

Two specimens Parkside, South Australia, in October.

Allied to *scæopis*, Mey., but the cilia of hindwings distinguish it from that species.

TRITYMBA DASYBATHRA, *n. sp.*

Male, 21 mm. Head dull-ochreous; antennæ fuscous. Legs fuscous, posterior pair greyish; palpi greyish. Thorax and abdomen greyish; thorax with a suffused blackish central spot. Fore-

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wings elongate-moderate; costa gently arched, strongly towards apex; apex acute, hindmargin oblique, continuous with inner-margin; silvery-grey; a black basal patch, trifurcate on anterior portion; a blackish, round spot in middle of wing near apex; cilia grey, fuscous tinged. Hindwings fuscous; cilia as forewings.

One specimen at Parkside, South Australia, in December.

Allied to the preceding.

DEPRESSARIADÆ.

Enæmia pyrochrysa, *n. sp.*

Male, 32 mm. Head, antennæ, legs, palpi, and abdomen fiery-orange; posterior and middle legs and abdomen beneath whitish-yellow. Thorax whitish-yellow, with anterior and median transverse, narrow, fiery-orange bands, and a narrow, median, longitudinal stripe. Forewings elongate-oblong, dilated somewhat posteriorly; light ochreous-yellow; costal edge fuscous towards basal third. Two very irregular transverse fuscous fasciæ: first from beyond one third of costa to one-fourth inner-margin, suffused on lower half, upper portion connected with a very large apical and hindmarginal patch of dark-fuscous, which contains a roundish spot of ground-colour beneath apex, and five small, cuneiform spots of same in a curve at three-fourths; second fascia from lower portion of this patch, starting at end of cell, narrow and dentate, ending on inner-margin just beyond middle, but sending an oblique, narrow streak to anal angle from middle, the veins on the patches of ground-colour are outlined with scarlet; cilia ochreous-white, with a fuscous hindmarginal line, except beneath apex. Hindwings and cilia bright deep-orange.

One specimen from Cairns, Queensland, in October.

Enæmia callianthes, *n. sp.*

Female, 25 mm. Head ochreous-white. Palpi, thorax, and antennæ dark-fuscous; terminal joint of palpi ochreous-white; thorax with a posterior ochreous-white triangular patch. Abdomen orange-red. Legs reddish-ochreous. Forewings moderate; costa gently arched, apex obtuse; hindmargin oblique, dark-brown, with ochreous-white markings; a large, subquadrate patch at base, but not reaching costa; two triangular patches, one on costa at one-third, the other immediately below on inner-margin; two similar, but much larger patches at three-fourths, one on costa, one on inner-margin opposite, their apices nearly touching; a small apical spot; cilia ochreous-white, at anal angle fuscous. Hindwings reddish-orange; a suffused, fuscous, apical blotch extending to middle of hindmargin; cilia orange-red, round patch fuscous.

Two specimens at Mackay, Queensland, in December.

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PEDOIS NEUROSTICHA, *n. sp.*

Male, 25 mm. Head, palpi, antennæ, legs and thorax ashy-grey whitish, second joint of palpi with black apical and subapical rings, legs whitish externally, abdomen greyish-fuscous. Forewings elongate-oblong, moderately broad, costa arched, strongly at base, hindmargin obliquely rounded; ashy-grey whitish, with innumerable spots and dashes and fuscous, a darker obscure discal dot before middle, a second, in a line with first, beyond middle; a hindmarginal row of well-defined dark-fuscous dots, sometimes extending to apical fourth of costa, preceded by a dentate suffused line of dark-fuscous, from middle of costa to anal angle; cilia grey-whitish. Hindwings fuscous-grey, costal third whitish; cilia grey, with a darker median line.

Two specimens from Gisborne, Victoria, sent by Mr. G. Lyell, jun., and taken in November.

GRACILARIADÆ.

GRACILARIA POLYPLACA, *n. sp.*

Female, 11 mm. Head whitish, maxillary palpi pale-crimson, labial palpi white, second joint pale crimson, abdomen greyish-ochreous. Legs ochreous-whitish, anterior pair tinged with pale-crimson, all tarsi with slender blackish apical rings. Forewings narrow, crimson, with five costal streaks, one hindmarginal, and four dorsal streaks of creamy-yellowish; a hardly perceptible creamy-yellowish spot on costa near base; first costal spot small, irregular quadrate; second reaching half across wing, curved-elongate; third narrow-elongate, lying along costa; fourth similar to second, fifth similar to third, but suffusedly margined beneath with dark-fuscous; dorsal streak irregular, semiovate, creamy-yellowish, first at about one-third, second in middle, third near anal angle; hindmarginal streak distinctly yellowish-tinged from just below apex to near anal angle; a black spot on costa near apex, edged suffusedly anteriorly with fuscous; cilia greyish-ochreous, with a crimson apical hook. Hindwings and cilia dark-grey.

One specimen at Duaringa, Queensland, in December. Between *Ida*, Meyr., and *formosa*, Stt., but differs from either in having less costal and dorsal streaks, besides other details.

GRACILARIA HETEROPSIS, *n. sp.*

Male, 11 mm. Head and palpi snow-white, second joint of palpi ochreous-tinged. Thorax and antennæ golden-ochreous, thorax with a snow-white anterior spot; abdomen ochreous-grey, beneath white. Legs white, anterior pair infuscated, tarsi of posterior and middle legs fuscous. Forewings slightly dilated

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posteriorly; golden-ochreous, with iridescent whitish-blackish margined markings, except a broad white streak along inner-margin from base to near hindmargin; extreme costal edge slenderly-whitish from about middle to apex; a narrow sub-costal streak from base to beyond middle of wing, slightly deflected to middle; an oblique streak from middle of inner-marginal streak; a similar oblique streak from middle of costa to middle of wing above anal angle, and there almost touching a similar streak from apex of broad inner-marginal streak; two slender parallel fascia, angulated in middle, starting from small wedge-shaped, snow-white costal spots, and reaching anal angle, lower half of space between fascia and hindmargin reticulated with blackish; a cartridge-shaped white hindmarginal patch occupying apical portion of wing, and containing a small black spot edged with dull metallic; a black hindmarginal line; cilia golden-brown, with a white tooth above black spot, and a smaller one on middle of hindmargin. Hindwings fuscous; cilia greyish-ochreous.

One specimen at Duaringa, Queensland. Nearest *nereis*, Meyr., but is very different.

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Remarks on South Australian Rhopalocera.

By Oswald B. Lower, F.E.S., &c.

[Read May 1, 1894.]

In vol. XVII., Part II., Transactions of our Society, Mr. J. G. O. Tepper has given what purports to be a criticism, or reply, to my paper published in Part I. of the same volume. I shall remark on the species *seriatim*.

Delias aganippe, *Don.*

The figure in Mr. Tepper's former paper (1881) either represents this or some fictitious species. It is certainly not "*Harpalyce.*" I have the whole of the catalogued Australian species, and the figure approaches "*aganippe*" the most. If, as Mr. Tepper suggests, it may be "*argenthona,*" all I can say is that such plates are very misleading and worse than useless. Some years ago I received a poor specimen of the latter species from Mr. Tepper under the name of "*aganippe.*" This, I think, is how the confusion has occurred.

D. harpalyce, *Don.*

This has *not* been taken in South Australia up to the present.

D. argenthona, *Fab.*

This is essentially an Eastern Australian insect, and has not yet been recorded from Victoria. I should be very pleased to place it on the list, but the locality requires confirmatory information, Mr. Angas notwithstanding. It does seem strange that, with so many zealous (?) collectors, Mr. Tepper enumerates that this species has been overlooked (?) for so long.

Belenois perimale, *Don.*

This I *did not* include in my list. It has never to my knowledge been taken in S.A. I have specimens from Port Darwin and Sydney; it does not occur in Victoria. As Miskin rightly points out, this is the var. of *Pieris scyllara*, Macleay; it has light-brown hindwings on the underside. Mr. Tepper exhibited at one of our meetings species of *Pieris teutonia* as this species, hence the confusion.

Danais petilia, *Stall.*

This *is* a widely different species from *chrysippus*, Linn. I saw in one of the Museum cases a specimen of a female *Hypolimnas*

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misippus (as coming from S.A.) labelled in Mr. Tepper's handwriting as above, *i.e.*, *chrysippus*; it is in this manner that errors of locality are recorded.

DANAIS ERIPPUS, *Cram.*

This may be a "notoriously modern introduction," but it is *not* "sporadic."

XENICA ACHANTA, *Don.*

This was *not* in Mr. Tepper's list, hence my reason for mentioning it.

PYRAMEIS ITEA, *Fal.*

Of this species Mr. Tepper says, "The stinging nettle cannot have been the original food-plant of this species." I did not say it was the *original* food-plant, but I did say that the species feeds on it, and can be reared in the usual manner. My Notes were intended as a guide to future students.

P. KERSHAWI, *McCoy.*

I always admitted that this species is a very slightly divergent form of "*cardui.*" My reason for adopting the first name was on account of it being better known, and out of respect to Prof. McCoy. Mr. Tepper miscontrues my remarks when he says that "dry cowdung" cannot be the proper shelter of the chrysalides of this species. I simply mentioned the fact as being of general interest to collectors, and never thought for an instant that it was the "proper" shelter, but more likely an adaptation to circumstances.

JUNONIA VELLIDA, *Fal.*

The word "*Junonisa*" is wrong. I should have thought Mr. Tepper would have noticed the error.

LUCIA LUCANUS, *Fabr.*

Most of the genera of Lycœnidæ are not separated by very slight differences, as Mr. Tepper would have us believe. It is not my intention to write a dissertation on the family, but I could point out well-marked differences in the genera *Polyommatus*, *Cupido*, *Lucia*, &c. The "qualifying terms" are *not* exaggerated in this instance. For the benefit of Mr. Tepper and others not conversant with the species I may mention that "*lucanus*" is in general appearance very like *Lycœna agricola*, D. & H., but has a fiery copper discal area; in "*aurifer*" the shape of wings is quite different; in fact, as dissimilar as can be, being in shape like *Euchloris (Iodis) bipunctifera*, Walk., with its peculiar angulated hindwing. The chequered cilia of "*lucanus*"

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is wanting in *aurifer*. I strongly suspect Mr. Tepper has not yet seen the true "*aurifer*," but is referring to "*ænea*," Miskin. Sir W. MacLeay did *not* confuse two species when he gave Mr. Tepper the name "*discifer*," H. S., this name, as I mentioned. being synonymic with "*lucanus*." Kirby's Synonymic Catalogue, quoted by Mr. Tepper, is not a masterpiece on the subject, and sadly requires revising. Mr. Tepper has miscontrued my remarks with regard to this species frequenting "Stinkwort." It is incorrect to say I "suggested" this as being the food-plant. I mentioned the fact of its "frequenting" stinkwort for the benefit of those interested in our branch of Natural History, and the reference is not misleading.

OGYRIS, *Westw.*

Before making any remarks in answer to Mr. Tepper's criticisms, I would advise him to study Miskin's revision of the genus (Proc. Linn. Soc., N.S.W., 1890), wherein the doubts and differences of several species are set at rest. What I wrote on this genus is substantially correct, and admits of no doubt, with the exception perhaps of *O. amaryllis*. In reference to this species, I have recently received a communication from Mr. E. Guest, of Hoyleton, stating that he has taken this species and "*orœtes*" *in cop*. This almost convinces me that they are one and the same species, but what I cannot understand is the well-marked difference on the underside of the two species. In the sexes of all the other species the markings of the underside are identical, and it seems very strange that such expert Lepidopterists as Hewitson and Miskin should make mistakes. Miskin says Hewitson's figures represent *females* of both "*orœtes*" and "*amaryllis*." Mr. Tepper says it is the *male* "*orœtes*" which is shown. I possess what is said to be female "*orœtes*." It is the identical species which Miskin identified and based his conclusions on, but really I must acknowledge that the specimen is not in a condition to decide with any accuracy as to it being a *female*, as Miskin makes it. In conclusion, I may here say that I intend to keep the two(?) species separate until confirmatory evidence is forthcoming to show that they are one and the same species. I think that Mr. Tepper's remarks respecting "*idmo*" and "*halmaturia*" call for no special remarks, but as he has challenged my decisions I must retaliate. I here again state that the so-called *female* "*halmaturia*," Tepp., is the *male* of *idmo*, Hew., and the so-called *male* "*halmaturia*" is identical with Felder's figure of the *male* "*otanes*." Miskin is in error in supposing it, *i.e.*, *otanes*, to be a small form of "*genoveva*." Any one has only to compare the published descriptions of the above-mentioned species to see that there is no difference. Kirby's inclusion of Hewitson's "*otrontas*" (I pre-

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sume Mr. Tepper means "*orontas*") with "*idmo*" is either a misprint or mistake, and intended, it seems to me, for "*otanes*," as *orontas* is *without* the large pale spot of the forewing of the *female—vide* Mr. Tepper. The female "*orontas*" *has* a dull white sub-apical patch on the forewing. So has "*idmo*." So that it is Mr. Tepper's ideas which are "fanciful," and not mine. This I am prepared to prove at any time, only stipulating that he who is in the wrong shall acknowledge the error in the Transactions of this Society. Mr. Tepper's concluding remarks respecting "*amaryllis*" being probably "sporadic," express his private opinion.

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On the Occurrence of the Fissurellid Genus *Zidora* in Australian Waters.

By Professor Ralph Tate.

[Read May 1, 1894.]

The genus *Zeidora* was instituted by A. Adams in 1860, for the reception of two Japanese shells having the outer aspect of *Emarginula* and an internal shelf as in *Crepidula*. Reeve in his monograph, 1873, figures the two species described previously by Adams. Two species referrable to this genus occur in Pliocene strata in Italy, upon one of which Sequenza, 1880, proposed his genus *Crepiemarginula*, which Boog Watson, "Challenger Report," 1886, relegates to a synonym. Mr. Beddome, Proc. Roy. Soc. Tasm. for 1882, p. 169 (1883), founded his genus *Legrandia* on an undoubted example of *Zidora*. Boog Watson, *op. cit.*, added another species to the genus, from the West Indies, making four in all known in living creation. It is not at all improbable that the shell I am about to describe is conspecific with Beddome's *Legrandia Tasmanica*. Fischer, "Manuel de Conch.," 1885, emended the spelling of the generic name to *Zidora*.

The genus is of extreme interest from a morphological point of view, which is enhanced by the beauty of ornament and rarity of occurrence of the shells. The animal of *Zidora* is unknown, and despite the analogy that the shell presents to *Emarginula* and *Puncturella*, Mr. Boog Watson is disposed to view the shell as an internal one, and that "its true place will probably be found among the Opisthobranchiata, perhaps in the neighbourhood of *Pleurobranchus*."

The shells of the living species have hitherto been obtained only from moderately deep water.

Zidora Legrandi, *spec. nov.* (1894).

Shell depressedly conical, cap-shaped, white, delicate, elliptic-oblong in basal outline, rounded behind, truncately rounded and deeply cleft in front, with a narrow sunken fissural band extending to the apex; back depressedly convex; apex minute and short, hooked and somewhat adpressed, almost reaching the posterior margin.

The ornament consists of concentric threadlets and obliquely radial threadlets, which produce an elegant cancellation of rhombic spaces; in the apical region the ornament is extremely fine, but beyond it the cancellation is visible to the unaided eye

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(there are about nine rows of rhombic spaces in a radial distance of 2 millimetres measured from the periphery). The margin of the aperture is closely crenulate-serrate. The fissural band is margined on each side by an elevated rounded keel, which is crenately sculptured; the scars on the fissural band are arched, sharp and close, but not contiguous.

The inside is glossy and smooth; the septum is narrowly crescentic (extending in the middle line to about one-fifth and on the sides to about one-fourth of the length of the aperture), much depressed posteriorly (about one-half the depth of the shell) becoming shallower on the anterior border, which almost reaches the base of the shell.

Dimensions.—Antero-posterior diam., 9·5; lateral diam., 6·; height, in about the middle line, 2· (vix); depth of cleft, 2 millimetres.

Localities.—Corney Point, Spencer Gulf, one example from shell-sand *(Dr. Perks);* dredged in 7 to 20 fathoms in Backstairs Passage, five dead examples *(Dr. Verco).*

Remarks.—Mr. Beddome's definition of the genus and species of *Legrandia Tasmanica* reads as follows:—

"LEGRANDIA, shell emarginulaform, but with an internal plate like Crypta.

LEGRANDIA TASMANICA, shell oval, radiately ribbed; front edge fissured; interior with a shelly plate extending one-fourth the length of the shell. Long., 5 mill.; lat., 3 mill.; alt., ·75 mill. Habt., Kelso Bay, Tamar River, 17 fms."

The specific description barely permits of a comparison with the South Australian specimens, though there is a substantial agreement in the size of the internal plate, and the exterior dimensions are proportionately the same, the measures of the Tasmanian shell being about one-half of the largest of the South-Australian specimens.

Without comparison of actual specimens it is impossible to establish identity, though there is presumptive evidence that the two shells belong to one species. In this latter consideration I have thought it best, as is the practice in botanical nomenclature, when a generic name is suppressed to employ it as a specific name for the type-species, and so preserve the intention of the original author, in this case to compliment the veteran conchologist of Tasmania, Mr. Legrand.

Of the three living species diagnostically known and figured, *Z. Legrandi* seems to resemble *Z. calceolina* more than the others; but in one particular it differs from all, namely, by its apex situated within the vertical plane of the posterior margin, and not as in them projecting beyond the periphery.

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Descriptions of Micro-Lepidoptera from Moreton Bay.

By A. Jefferis Turner, M.D.

[Read March 6, 1894.]

I shall endeavor in these papers to give a complete list of the species which I have been able to identify as occurring in the neighborhood of Brisbane under the head of each genus treated of; and to describe any species believed to be new with regard to whose generic position I feel satisfied. The admirable work of Mr. Meyrick on the Australian micro-lepidoptera has alone rendered any such work by a local naturalist possible, and I cannot too strongly express my indebtedness to his papers for any worth that my own may possess. I must also express my indebtedness to Mr. Lower, of Adelaide, for advice and assistance, and to Dr. Lucas and Mr. Illidge, of Brisbane, for access to their valuable collections.

GRACILARIDÆ.

Gracilaria, Z.

This beautiful and easily recognised genus appears to be well represented about Brisbane. Besides the twenty-one new species here described, I have obtained here the following:—

Grac. xanthopharella, Meyr.
" *plagata*, Stt.
" *autadelpha*, Meyr.
" *calicella*, Stt.
" *chalcoptera*, Meyr.
" *formosa*, Stt.
" *ida*, Meyr.
" *eumetella*, Meyr.
" *laciniella*, Meyr.
" *albomarginata*, Stt. (?)

I have reared *Grac. laciniella*, Meyr., from larvæ, using the leaves of *Eucalyptus sp.* I am not quite certain of the identification of *Grac. albomarginata*, Stt., but I have one specimen which generally corresponds to the description, except in having blackish antennæ.

Grac. plagata, *Stt.*

Middle tibiæ very much thickened with greyish-ochreous

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black-tipped scales, forming a distinct crest on their upper surface.

Brisbane; taken occasionally on fences in September.

GRAC. ALBOSPERSA, n. sp.

14 mm. Head, thorax, and maxillary palpi greyish-ochreous. Labial palpi with apical fourth of second and terminal joints thickened with scales, so as to form minute tufts, greyish-ochreous; apical third of second joint, external surface and apical half of upper surface of terminal joint suffused with dark fuscous; extreme apex whitish. Antennæ longer than forewings, greyish-ochreous annulated with fuscous. Abdomen greyish-ochreous. Posterior third suffused above with fuscous, beneath with five pairs of black dots. Legs pale ochreous-fuscous; apical portions of tarsal joints dark fuscous; middle tibiæ densely thickened with dark fuscous scales. Forewings ochreous-fuscous, sparsely irrorated with black scales, with irregularly outlined white markings; a white dot on costa, near base, reaching to fold; a larger oblong white area on costa at one-fifth, reaching to fold; a similar area at two-fifths; two small irregularly outlined white dots on costa at three-fifths and four-fifths, and two more between the latter and apex; apex and anterior margin of two apical dots blackish; five white dots on inner margin at three-eighths, four-eighths, five-eighths, six-eighths, and seven-eighths, the first of which is larger than those following; cilia ochreous-fuscous, with two imperfect dark lines; beyond anal angle dark grey. Hindwings and cilia dark grey.

Resembles in coloring *Grac. syringella*, Fab. The minutely tufted apices of the labial palpi appear to be a peculiar character.

Brisbane; taken occasionally on fences in spring.

GRAC. CHLORELLA, n. sp.

12 mm. Head, face, and thorax whitish-ochreous. Maxillary palpi whitish-ocreous, with two black annulations; labial palpi externally blackish, extreme apex whitish-ochreous; internally whitish-ochreous, annulated with black at apex of second joint, about middle of terminal joint, and again before apex. Antennæ whitish-ochreous, sharply annulated with black. Abdomen dark ochreous-fuscous, becoming blackish at apex. Legs, anterior and middle tibiæ ochreous-fuscous, densely irrorated with black; middle tibiæ much thickened with scales; posterior tibiæ whitish, annulated with black; tarsi whitish, annulated with black. Forewings ochreous-fuscous with a greenish tinge, densely irrorated with black scales, these are especially dense over costal half of disc and towards base; five costal and four dorsal ill-defined irregularly outlined whitish-ochreous spots; cilia ochreous-

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fuscous irrorated with black, at anal angle and inner margin dark grey. Hindwings and cilia dark grey.

In general appearance comes very near to *Grac. syringella*, Fab.

Brisbane; one specimen on a fence in September.

GRAC. EURYCNEMA, n. sp.

15-16 mm. Head and thorax reddish-fuscous; face and maxillary palpi paler; labial palpi, terminal joint as long as second, stout, and obtuse at apex, dark fuscous, internal surface whitish. Antennæ longer than forewings, greyish-ochreous annulated with black. Abdomen ochreous-fuscous, anterior half of upper surface paler. Legs ochreous-fuscous; tarsi annulated with dark fuscous; anterior and middle tibiæ dark fuscous, the latter densely thickened with scales. Forewings reddish-ochreous-fuscous irrorated with blackish scales, especially on costa and inner margin; cilia reddish-ochreous-fuscous on costa, dark fuscous on hindmargin, dark grey on inner margin. Hindwings and cilia dark grey.

The resting position of this insect is an exaggeration of that common to most of the genus. The first two pairs of legs form a wide elevated arch on which the forewings closely appressed appear to rest at a very steep angle.

Brisbane; taken occasionally on fences in August and September.

GRAC. EUGLYPTA, n. sp.

14 mm. Head and thorax reddish-ochreous. Maxillary palpi whitish, apex reddish-ochreous; labial palpi whitish, extreme apex reddish-ochreous, and somewhat thickened with scales; terminal joint shorter than second, apex moderately acute, reddish-ochreous with two transverse fuscous lines on external surface. Antennæ larger than forewings, whitish-ochreous annulated with fuscous. Abdomen ochreous, upper surface suffused with fuscous posteriorly, two pairs of black dots on lower surface, apical tuft ochreous. Legs reddish fuscous; anterior femora upper half whitish, lower half dark fuscous; anterior tibiæ dark fuscous; middle tibiæ densely thickened with scales, bases of tarsal joints whitish. Forewings pale reddish-ocherous irregularly mottled with darker reddish-ochreous, the whole showing a violet reflection in oblique light; costa whitish-ochreous from one-fourth to apex; a distinct black dot on costa at one-fourth and another at one-half, beyond the latter are two or three very minute costal dots; cilia reddish-ochreous with two incomplete hindmarginal lines, on inner margin dark grey. Hindwings and cilia dark grey.

Apparently allied to the preceding.

Brisbane; one specimen on a fence in September.

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GRAC. XYLOPHANES, n. sp.

9-12 mm. Head and thorax reddish-ochreous. Face and maxillary palpi whitish-ochreous; labial palpi pale reddish-ochreous, second and terminal joint dark fuscous at apex, terminal joint also with a dark fuscous line at one-third on external surface. Antennæ longer than forewings, greyish-ochreous annulated with fuscous. Abdomen ochreous-fuscous, paler beneath. Legs whitish, apex of tarsal joints fuscous; lower third of anterior femora dark fuscous; anterior and middle tibiæ dark fuscous, the latter densely thickened with scales. Forewings reddish-ochreous, becoming whitish-ochreous on costa, irregularly mottled with reddish-fuscous; an ill-defined transverse fascia of the paler ground-color at one-third, narrowing from costa to inner margin; a few minute fuscous dots on costa and hindmargin; cilia ochreous-fuscous with two darker lines, beyond anal angle dark grey. Hindwings and cilia dark grey.

The forewings are shorter than those of the preceding and proportionately broader. The markings of forewings are very obscure.

Brisbane; taken occasionally on fences in September.

GRAC. OCTOPUNCTATA, n. sp.

10-12 mm. Head clear white. Thorax dark fuscous. Face and maxillary palpi whitish; labial palpi white, apex of second joint dark fuscous, terminal joint with two dark fuscous transverse lines at half and before apex. Antennæ grey annulated with dark fuscous. Abdomen above dark fuscous, beneath ochreous-fuscous. Legs dark fuscous, tarsal joints white except at apices, middle tibiæ densely thickened with scales, upper half of anterior femora yellowish-white. Forewings dark fuscous, with four spots white, faintly yellowish tinged and narrowly outlined with black; first on inner margin at one-fourth, reaching to fold, produced along margin almost to base; second on costa before half, parallel-sided, outwardly oblique, not quite reaching fold; third on inner margin at two-thirds, broadest on margin, triangular or trapezoidal, reaching beyond fold; fourth on costa at three-fourths, similar to second, directed towards but not reaching anal angle; cilia dark fuscous with three blackish hindmarginal lines. Hindwings and cilia dark grey.

Brisbane; three specimens taken at light in April.

GRAC. TRAPEZOIDES, n. sp.

10 mm. Head, thorax, and maxillary palpi pale grey; labial palpi whitish, second joint at apex, and terminal joint at three-fourths ringed with black. Antennæ grey, not annulated. Abdomen dark-fuscous above, whitish beneath. Legs whitish,

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tarsal joints dark-fuscous at apex, anterior and middle tibiæ dark-fuscous at base and apex, the latter scarcely thickened. Forewings ochreous-fuscous, with four inner marginal dots clear white and four costal streaks whitish-ochreous, all margined with dark-fuscous; first inner marginal dot close to base, parallel-sided, fascia-like, reaching almost to costa, upper margin ill-defined; second at one-fourth, triangular, with rounded apex, broadest on margin, reaching two-thirds across disc; third at half trapezoidal, broadest on margin, reaching slightly beyond middle of disc; fourth at anal angle, smaller, roundish—from it is a narrow whitish suffusion along hindmargin towards apex; costal streaks narrow, parallel-sided, outwardly oblique, at half, three-fourths, five-eighths, and just before apex; the second is twice as long as the others, and is directed towards but do not reach anal dot; apical angle narrowly black-margined; costal cilia black, hindmarginal ochreous-fuscous, inner-marginal dark-grey. Hindwings and cilia dark-grey.

Brisbane; two specimens taken by Dr. Lucas.

GRAC. IRRORATA, n. sp.

6-8 mm. Head, thorax, face, and maxillary palpi white. Labial palpi white, second joint at apex and terminal joint beyond middle annulated with black. Antennæ dark-grey. Abdomen fuscous above, whitish beneath. Legs white, anterior tibiæ blackish; middle tibiæ very slightly thickened, blackish at base and apex; posterior tibiæ with three blackish annulations, clothed above with stiff white hairs; basal joints fuscous at apex. Forewings greyish-ochreous, with four white transverse fasciæ, all finely irrorated with greyish-ochreous scales, and thinly and irregularly outlined with black; first perpendicular at one-fourth, broad both on costa and inner-margin, produced along inner-margin to base, anterior margin encroached upon by ground-colour below centre of disc to almost half its thickness; second at half, perpendicular, margins slightly irregular; third from costa at three-fourths to inner-margin before anal angle, perpendicular, attenuated in centre of disc, where it is also interrupted by black scales; fourth from costa near apex to anal angle, where it is almost confluent with third, posterior margin ill-defined; hindmargin greyish-ochreous, narrowly edged with black; cilia whitish-grey, with two black hindmarginal lines. Hindwings and cilia grey.

Apparently allied to *Grac. ordinatella*, Meyr.

Brisbane; two specimens at light.

GRAC. CALICELLA, *Stt.*

This species is occasionally variable in its markings. In many Brisbane specimens the basal dot reaches costa to form a com-

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plete fascia, as in Stainton's original description. I have one specimen in which the anterior costal dot is confluent with that on inner-margin at anal angle; and have seen another in which the anterior costal dot is altogether absent, while the anal dot is produced to costa, absorbing the posterior costal dot.

Brisbane. Taken commonly on fences in August and September. Also one specimen at Bulli, N.S.W., in October.

GRAC. ALBOMACULELLA, n. sp.

7 mm. Head, thorax, face, and maxillary palpi clear white. Labial palpi white, second joint at apex, and terminal joint beyond middle annulated with black. Antennæ dark-grey. Abdomen fuscous above, whitish beneath. Legs whitish, tarsal joints fuscous at apex, anterior and middle tibiæ dark-fuscous at apex, the latter slightly thickened. Forewings ochreous-fuscous, with one fascia and six spots, clear white, narrowly black-margined; first spot on inner-margin close to base, rounded above, not reaching to fold; fascia before one-third, slightly outwardly oblique, narrow and parallel-sided from costa to just before fold, where it suddenly dilates to treble breadth, and is thus confined to inner-margin; second spot on costa at one-half, slightly outwardly oblique, reaching one-third across disc, rounded below; third spot on inner margin at three-fourths, larger than second, rounded above, not reaching centre of disc, widely separated from second; fourth in disc at three-fourths, slightly above centre, very minute, connected with costa by a blackish cloud; fifth very small at anal angle; sixth parallel-sided, very oblique from costa at seven-eighths to middle of hindmargin; cilia ochreous-fuscous, with a black line near apex, on inner-margin dark-grey. Hindwings and cilia dark-grey.

Closely allied to *Grac. calicella.* Stt., and *Grac. hoplocala,* Meyr. Besides minor differences it may be distinguished from the former by the absence of one costal spot, and from both by the presence of an additional inner-marginal and a discal spot.

Brisbane; one specimen taken on a fence in August.

GRAC. OBSCURELLA, n. sp.

8 mm. Head, thorax, face, and maxillary palpi ochreous-whitish. Labial palpi ochreous-whitish, terminal joint annulated beyond middle with pale-fuscous. Antennæ longer than forewings, greyish-ochreous, gradually darkening toward apical half, which is dark-fuscous. Abdomen above ochreous-fuscous, beneath ochreous-whitish. Legs whitish, tarsal joints fuscous at apices; anterior and middle tibiæ fuscous, with two obscure whitish annulations, the latter moderately thickened at apex with dark-fuscous scales; posterior tibiæ whitish, clothed above with stiff

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hairs. Forewings pale ochreous-fuscous, irrorated with darker scales; with five narrow indistinct transverse fasciæ, pale ochreous-fuscous, transverse or slightly outwardly oblique from costa at one-eixth, two-sixths, three-sixths, four-sixths, and five-sixths, the last two becoming obsolete towards inner-margin; a triangular whitish spot on costa before apex, extending into costal cilia; apex darker ochreous-fuscous; cilia pale ochreous-fuscous, with indistinct darker hindmarginal line. Hindwings and cilia dark-grey.

A very inconspicuous species, not nearly allied to any with which I am acquainted.

Brisbane; one specimen on a fence in September.

GRAC. ENCHLAMYDA, n. sp.

8-9 mm. Head and thorax whitish or ochreous-whitish. Face and maxillary palpi whitish. Labial palpi whitish. Antennæ dark-grey. Abdomen above dark-fuscous, beneath whitish. Legs whitish, tarsal joints dark-fuscous at apices; anterior tibiæ and first tarsal joints dark-fuscous; middle tibiæ with three dark-fuscous annulations, not thickened. Forewings whitish or ochreous-whitish, the middle third occupied by a broad fascia, ochreous-fuscous, narrowly edged with black, anterior margin outwardly oblique from costa, posterior margin less oblique, slightly convex; basal one-sixth of disc suffused with ochreous-fuscous; outside the transverse fascia are two variable longitudinal, parallel black lines, one in centre of disc, the other between that and costa; a roundish subapical costal spot, ochreous-fuscous, margined with black, or entirely blackish; extreme apex ochreous-whitish; cilia on costa ochreous-fuscous, on hindmargin whitish-ochreous, with median black line; on inner-margin dark-grey. Hindwings and cilia dark-grey.

A very distinct species, somewhat variable.

Brisbane; three specimens taken on a fence in August and September.

GRAC. IDA, *Meyr.*

The typical form of this species is occasionally taken near Brisbane.

GRAC. IDA var. ROSEA, n. var.

Very distinct in its coloration, forewings clear crimson-pink, without any fuscous suffusion; markings more yellowish-tinged than in the typical form, but agreeing closely in detail, though both forms show slight variations.

This beautiful insect is common about Brisbane. I have frequently beaten it from the native box (*Tristania conferta*), but do not know the larva. It is quite distinct from *Grac. formosa*, Stt., which is also occasionally taken near Brisbane.

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GRAC. AURORA, n. sp.

Head pale fuscous. Face silvery-white. Maxillary palpi yellow. Labial palpi reddish-orange, bases whitish, extreme apices fuscous. Antennæ longer than forewings, whitish-ochreous, with dark-fuscous annulations. Thorax reddish-violet above, bright yellow on sides. Abdomen above anteriorly whitish-ochreous, posteriorly ochreous-fuscous; beneath whitish. Legs, tibiæ reddish-violet, middle pair moderately thickened, tarsi whitish. Forewings brilliant-yellow; an ill-defined reddish-violet band, rather less than one-third breadth of disc, runs from base along inner and hindmargins to apex; in this band is a blackish dot at about one-fourth, and a second just outside this; several smaller blackish dots on inner margin, and five or six similar dots on hindmargin; cilia on costa yellow, on hindmargin reddish-violet towards apex, grey towards anal angle. Hindwings and cilia grey.

This brilliant insect appears to be allied to *Grac. adelina*, Meyr., from New Zealand.

Brisbane; one specimen taken on a fence in September by Dr. Lucas.

GRAC. FLUORESCENS, n. sp.

8–9 mm. Head and thorax ochreous-whitish. Face and maxillary palpi white. Labial palpi white, second joint externally pale-fuscous. Antennæ dark-fuscous. Abdomen dark-fuscous above, white beneath. Legs, anterior femora white, tibiæ dark-fuscous, tarsal joints dark-fuscous at bases, white at apices; middle femora dark-fuscous, tibiæ whitish, slightly thickened, and dark-fuscous at apices, tarsi as above; posterior tibiæ dark-fuscous above, white beneath; tarsal joints dark-fuscous, with white apices above, wholly white beneath. Forewings brassy-fuscous; a sharply-defined inner-marginal streak, one-third breadth of wing, yellowish-white, with brilliant metallic lustre, ending abruptly just before anal angle, posterior extremity dilated to one-half breadth of wing; the posterior margin of dorsal streak is edged with black, and often contains a minute black dot; on disc at seven-eighths is a black spot of somewhat irregular form, surrounded by an incomplete circle of brilliantly-lustrous white scales; from this a yellowish-white metallic suffusion extends to hindmargin just beyond anal angle; before apex a black spot extends from costa to hindmargin; extreme apex lustrous-whitish; cilia on costa first black then ochreous-whitish on hindmargin, ochreous-whitish becoming whitish at anal angle, with a black basal line at apex, and a black subapical hook, on inner-margin dark-grey. Hindwings and cilia dark-grey.

Allied to *Grac. nereis*, Meyr.

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Brisbane. Taken commonly on fences in August and September.

GRAC. NITIDULA, n. sp.

6-7 mm. Head and thorax brassy. Face and palpi silvery-white. Antennæ grey. Abdomen ochreous-whitish, suffused posteriorly with fuscous, beneath white. Legs white; tarsal joints pale-fuscous at apices on external surface; middle tibiæ slightly thickened at apices with fuscous scales. Forewings pale ochreous-fuscous, with irregular fuscous suffusion, several metallic areas, and a variable number of whitish-ochreous spots sometimes forming interrupted fasciæ; spots minute quadrangular, most numerous on costa, the remainder on inner-margin, they form interrupted slender transverse fasciæ at one-fourth and one-third; basal fourth of wing occupied by a brilliant metallic patch with reddish and violet lustre; a similar triangular patch on inner-margin beyond middle, not quite reaching costa; a small oval spot with long axis longitudinal in disc at seven-eighths, nearer costa than anal angle, showing brilliant violet-blue reflections; apex occupied by a rather large black spot; cilia brilliantly metallic on hindmargin, ochreous-whitish at anal angle, thence grey. Hindwings and cilia grey.

A minute but very brilliant species of uncertain affinity.

Brisbane. Five specimens taken in tropical forest growth.

GRAC. MICROTA, n. sp.

7 mm. Head and thorax ochreous-fuscous. Face and palpi white. Antennæ dark-fuscous, basal third grey, basal joint dark-fuscous. Abdomen above dark-fuscous, beneath white. Legs, femora white; anterior tibiæ and tarsi ochreous-fuscous, extreme apices of joints dark-fuscous, last two joints whitish; middle tibiæ and first two tarsal joints thickened throughout, ochreous-fuscous; posterior tibiæ upper surface with numerous stiff hairs, whitish-ochreous, black at apex, beneath clear white; posterior tarsi above whitish, apices of joints black, beneath clear white. Forewings ochreous-fuscous, confusedly marked with fine dark-fuscous dots and lines which do not form any definite pattern; on inner-margin before and beyond middle are two obtusely-triangular yellow spots reaching middle of disc; these contain one or two blackish dots; a minute metallic spot just before apex; cilia ochreous-fuscous, with a blackish hindmarginal line, on inner-margin dark-grey. Hindwings and cilia dark-grey.

An isolated species, unless it be distantly related to that next described.

Brisbane; One specimen at light.

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GRAC. PYROCHROMA, n. sp.

9-10 mm. Head and thorax bright-yellow. Face and maxillary palpi clear-white. Labial palpi white, second joint fuscous at apex, terminal joint with a median fuscous ring, beyond this yellowish. Antennæ longer than forewings, grey, basal joint yellow above, white beneath. Abdomen above fuscous, deepening in shade posteriorly, beneath white. Legs, anterior femora white, tibiæ and tarsi fuscous; middle tibiæ and first two joints of tarsi densely thickened with scales, reddish-fuscous, terminal joints not thickened, paler; posterior tibiæ and tarsi whitish. Forewings glossy reddish-purple, with darker purple dots, forming an interrupted line along costa; a bright-yellow dorsal streak from base, terminating abruptly at anal angle, edged with black, nearly half breadth of wing, indented to half its breadth, close to base and approximately at one-third, two-thirds, and at anal angle; costal edge from near base to apex occupied by a narrow, blackish-purple, irregularly-thickened line; internal to this is a narrow yellow line, sometimes suffused with reddish-purple; and internal to this again a longitudinal line in disc from two-thirds nearly to apex, with a metallic-blue lustre, narrowly bordered on each side with blackish; a brilliant-metallic spot at apex, and a yellow hindmarginal line continuous with that on inner margin; cilia whitish on costa, with a dark apical spot showing in certain lights a vivid-blue iridescence, on hindmargin reddish-fuscous, becoming paler towards anal angle, thence dark-grey. Hindwings and cilia dark-grey.

This brilliant insect rests with its head appressed to the surface. Except in the thickening of the basal tarsal joints of the middle pair of legs, it appears to agree structurally with this genus. I have not examined the neuration.

Brisbane; five specimens on a fence in August and September.

GRAC. ALBISTRIATELLA, n. sp.

7-8 mm. Head, thorax, face, and palpi white. Antennæ dark-grey. Abdomen above fuscous, beneath reddish-fuscous. Legs, anterior and middle pairs fuscous, posterior whitish; middle tibiæ not thickened. Forewings pale ochreous-grey, with a white line along inner-margin, and five costal and three dorsal white streaks; first costal streak at one-third, outwardly oblique, narrowly produced along costa half way to base; second from beyond middle, very oblique outwardly, produced as a very slender line to margin of fourth streak; third shortly beyond second, outwardly oblique, occasionally connected by a slender line from its base with second; fourth lustrous, coalescing with third dorsal to form an outwardly curved, slender, black-margined fascia from costa to anal angle; fifth a mere dot beyond fourth; first and

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second dorsal streaks parallel and close, ontwardly oblique, from about three-fourths ; a white line along hindmargin, broadening from apex to anal angle ; a black dot shortly before apex ; cilia grey, with a black apical dot and a black basal line along hindmargin. Hindwings and cilia grey.

Brisbane ; three specimens.

GRAC. PARALLELA, n. sp.

8 mm. Head, face, and palpi pure white. Antennæ dark-fuscous. Thorax white, lateral margins fuscous. Abdomen fuscous. Legs dark-fuscous, apices of tarsal joints whitish ; posterior pair whitish beneath, middle tibiæ not thickened. Forewings fuscous-grey, with a broad white stripe along inner-margin from base to anal angle, upper edge wavy, black-margined ; immediately beyond or continuous with this is a white line from anal angle gradually alternating to about middle of hindmargin ; a slender white black-margined line from costa to three-fourths to hindmarginal line at anal angle ; a second similar line from costa before apex to extremity of hindmarginal line ; a slender white line along costa from one-fourth to first streak, black-margined beneath ; cilia white with a short median fuscous line at apex, thence white to anal angle, on inner-margin grey. Hindwings and cilia grey.

Allied to *Grac. didymella*, Meyr., and *Grac. ochrocephala*, Meyr. It may be distinguished from the former by the white line on costa, and from the latter by the pure white head and dorsal streak.

Brisbane.

GRAC. TRISTANIÆ, n. sp.

7-8 mm. Head, face, and maxillary palpi pure white. Labial palpi usually pure white, second joint sometimes fuscous at apex. Antennal white, extreme apex fuscous. Thorax white, lateral margins ochreous-fuscous. Legs whitish, tarsal joints fuscous at bases, anterior and middle tibiæ fuscous, the latter not thickened. Forewings ochreous-fuscous, with a broad pure white streak extending along whole of inner-margin, and continued along hindmargin to end abruptly just before apex, its upper edge narrowly margined with blackish, wavy, and twice indented, first slightly opposite two-thirds of inner-margin, and again deeply so as to be almost interrupted at anal angle ; a white dot at apex ; cilia white, with a black hook at apex, at anal angle and on inner-margin grey. Hindwings and cilia grey.

Allied to the same group as the preceding, but readily distinguished by the simpler marking of the forewings.

Larva slightly attenuated posteriorly, golden-brown without

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markings, or with a fuscous oval spot placed transversely over dorsum of each segment, or over first segment only. Mines conspicuous blotches under the epidermis of the upper-surface of the leaves of the Native Box *(Tristania conferta)*, and may be found in abundance during the greater part of the year.

Brisbane.

GRAC. UNILINEATA, n. sp.

7-8 mm. Head, face, and palpi white. Antennæ white at base, gradually deepening to fuscous. Thorax white, lateral margins ochreous-fuscous. Abdomen above ochreous-fuscous, darker posteriorly, beneath white. Legs whitish, tarsi ringed with blackish fuscous, anterior and middle tibiæ blackish-fuscous at apex. Forewings ochreous-fuscous; a white dorsal streak from base ending abruptly close to anal angle, less than half breadth of wing, straight-margined; a white line along hindmargin from anal angle nearly to apex; apex black; a short longitudinal black line in disc beyond three-fourths, narrowly and interruptedly margined with white externally; cilia white, with a median black line and black subapical hook, at anal angle and inner margin grey. Hindwings and cilia grey.

Brisbane; two specimens.

GRAC. PLEBEIA, n. sp.

Head, face, and palpi white. Antennæ white at base, gradually deepening to fuscous. Thorax white, lateral margins ochreous-fuscous. Abdomen above ochreous-fuscous, beneath white. Legs whitish, tarsi ringed with fuscous, anterior and middle tibiæ fuscous at extremities. Forewings ochreous-fuscous; a white dorsal streak from base ceasing abruptly close before anal angle, half breadth of wing, straight margined; along its margin and at its extremity the ground colour is suffused with dark-fuscous; a triangular white spot on hindmargin, its apex reaching nearly to costa; a white streak from costa at four-fifths to extremity of inner-marginal line, ill-defined towards costa; apical portion of costa black, interrupted by a narrow white line, which meets apex of hindmarginal spot; cilia white, faintly ochreous-whitish at apex, with a black median line and sub-apical hook, along inner-margin grey. Hindwings and cilia grey.

This and the preceding two species are very similar. *Tristaniæ* may be distinguished by the indented inner-marginal line; *unilineata* by the straight inner-marginal line, less than half breadth of wing, and the short longitudinal black line on disc; *plebeia* by the straight inner-marginal line, half breadth of wing, and the triangular hindmarginal spot.

Brisbane; one specimen taken by Dr. Lucas.

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ŒCOPHORIDÆ.

In dealing with this family, I have endeavored to adhere faithfully to the genera as laid down by Meyrick; but have had to describe a few new genera which appear distinct from any of his. Of these the first two may not properly belong to this family at all; but as they are very distinct insects, and easily recognised, I hope that no confusion may arise from including them here temporarily. *Callizyga* is peculiar in veins seven and eight both running to hindmargin, in the short, stout, terminal joints of the labial palpi, and in the disparity of the sexes.

In *Scorpiopsis* the neuration appears to be normal, except in the sigmoid curve described by vein seven of the hindwings, but the palpi and shape of forewing are peculiar.

Callizyga, n. g.

Head loosely scaled, side-tufts moderate. Antennæ stout, in male strongly ciliated (3-4), pecten absent. Palpi moderate, second joint reaching base of antennæ, with appressed scales; terminal joint half as long as second, nearly straight, almost as stout as second. Thorax smooth. Forewings dilated, apex moderately acute, hindmargin sinuate. Hindwings as broad as forewings, cilia very short. Abdomen moderate in male, broad in female. Forewings with veins 7 and 8 stalked, both to hindmargin, 2 from before angle of cell. Hindwings normal. Sexes unequal.

Callizyga dispar, n. sp.

Male, 21-22 mm.; female, 31-35 mm. Head and thorax pinkish-grey. Face and palpi ochreous-grey. Antennæ ochreous-grey. Abdomen in male bright-orange, in female ochreous. Legs whitish-ochreous, anterior tibiæ and tarsi pinkish-grey. Forewings in male ochreous-grey, with a slight pinkish tinge; a few scattered fuscous scales, sometimes forming a streak from hindmargin below apex towards centre of disc; cilia orange-yellow; underside bright orange-red. In female pinkish-grey, with a slight ochreous tinge; a few scattered fuscous scales towards hindmargin; cilia yellowish. Hindwings and cilia in male bright orange-yellow. In female pale ochreous-yellow; cilia sometimes tinged with fuscous.

Brisbane. Beaten occasionally from *Eugenia*.

Scorpiopsis, n. g.

Head with appressed scales, side tufts moderate, closely appressed, slightly projecting between antennæ. Antennæ moderate (ciliations in male unknown); pecten absent. Palpi long, second joint exceeding base of antennæ; terminal joint much shorter than second, rather stout, with a well-developed

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short tuft on its posterior aspect shortly before apex. (Thorax imperfect.) Forewings moderate, apex rounded, hindmargin convex, not oblique. Hindwings broader than forewings, oblong-ovate, cilia less than one-third. Abdomen rather stout. Forewings with seven and eight long-stalked, eight to apex, seven to hindmargin, two from before angle of cell. Hindwings with v. 7 bent in a sigmoid curve so as to be approximated to six on disc, and diverging from it to hindmargin.

SCORPIOPSIS SUPERBA, n. sp.

Female, 20 mm. Head and face red, mottled with pale yellow. Palpi, second joint reddish-ochreous, internal surface whitish, ringed with white at apex, extreme apex red; terminal joint moderate, with a short posterior tuft about one-fourth its length just before apex, red, basal half whitish on posterior surface, apex beyond tuft whitish. Antennæ stout, reddish-ochreous. Thorax red mottled with pale yellow, shoulders white. Abdomen ochreous-whitish, tuft whitish. Legs whitish, anterior tibiæ and tarsi red, the latter with white annulations. Forewings somewhat dilated posteriorly, costa strongly arched, apex much rounded, hindmargin convex, rounded beneath, not oblique, inner margin sinuate; pale red irregularly suffused with fuscous, with numerous minute pale yellow spots; in posterior half these are arranged in longitudinal lines along the veins, which are slenderly outlined in fuscous between the spots; a fuscous line along costa to three-fourths, costal edge red; three larger pure white spots in disc at about one-fourth, and a fourth spot slightly beyond these; two lustrous silvery-white spots in costal portion of disc at three-fourths, one of these a small circular spot near costa, the other between this and centre of disc larger, oval, with long axis transverse, both finely outlined with deep red; a narrow fuscous hindmarginal line; cilia pale red with a pale fuscous median line, apices whitish-ochreous. Hindwings white faintly ochreous-tinged towards apices, cilia white.

Brisbane. One specimen taken by Dr. Lucas.

PALPARIA, *Wing.*

The following species of this genus have been taken in the neighbourhood of Brisbane :—

Palparia aurata, Walk.
" *uncinella*, Z.
" *semijunctella*, Walk.
" *pyroptis*, Meyr. (MSS.).
" *eonephela*, Meyr.
" *rectiorella*, Walk.

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PALPARIA SUBROSEA, n. sp.

Male, 25 mm. Head ochreous-fuscous. [Palpi broken.] Antennæ whitish-ochreous, ciliation in male 5. Thorax pinkish. Abdomen ochreous. Legs reddish-fuscous, tarsi fuscous, posterior tibiæ pinkish-grey. Forewings elongate, costa moderately arched, apex slightly produced, acute, hindmargin sinuate, very oblique; pale-red, irrorated with whitish-ochreous scales, especially along costa and hindmargin, where they replace the ground-colour; an ill-defined dark-fuscous line along posterior two-thirds of inner-margin; a dark-fuscous dot in disc before and a second after middle; cilia whitish-ochreous, at apex reddish, with a terminal fuscous dot. Hindwings as broad as forewings, whitish, towards apex rosy; cilia rosy, deeper at apex, becoming paler towards anal angle.

One specimen taken on Stradbrooke Island, Moreton Bay, by the late Mr. Boreham.

Though the palpi are unfortunately broken off, there can be no doubt as to the location of this species, which is allied to *Palp. eonephela*, Meyr., and *leucosta*, Lower.

LEPIDOTARSA, *Meyr.*

LEPIDOTARSA IRIOIDES, *Meyr.*

Brisbane; one specimen from *Casuarina* in October.

LEPIDOTARSA CHRYSCRYTHRA, n. sp.

Male, 16 mm. Head yellow, with a red spot on crown. Palpi, second joint basal two-thirds whitish, apical one-third reddish-fuscous; terminal joint ochreous. Antennæ ochreous. Thorax yellow, mottled with bright-red. Abdomen pale-ochreous. Legs ochreous, anterior tibiæ and tarsi red, mottled externally with yellow, internally with fuscous. Forewings moderate, costa slightly arched, hindmargin oblique; yellow, coarsely reticulated with bright-red, with alternate bars of yellow and red along hindmargin; a pale-yellow streak along costa from base to apex, its anterior three-fourths edged internally with fuscous; a broad fuscous line from base close to inner-margin, reaching margin at one-fourth, and continued along it to three-fourths; a broad fuscous streak from anal angle obliquely towards centre of disc, where it terminates in a fine point; cilia red, apices fuscous, at anal angle fuscous. Hindwings elongate-ovate; pale ochreous-whitish; cilia whitish.

A truly brilliant insect.

Brisbane; one specimen taken at light.

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LEPIDOTARSA LEUCELLA, n. sp.

Male, 13 mm. Head, palpi, and antennæ white. Thorax white, finely irrorated with greyish-fuscous. Abdomen whitish. Legs white. Forewings white, faintly ochreous-tinged posteriorly; finely irrorated with greyish-fuscous; cilia ochreous-whitish. Hindwings and cilia ochreous-whitish.

Allied to *Lepid. alphitella*, Meyr., but without the discal dots.

Brisbane; one specimen beaten from ti-tree *(Melaleuca)* in October.

EOCHROIS, *Meyr.*

The following have been taken near Brisbane:—

Eochrois lætiferana, Walk.

I have reared this species from larvæ spinning together the phyllodes of *Acacia longifolia*.

Eochrois matutinella, Walk.
" *protophaës*, Meyr.

EOMYSTIS, *Meyr.*

This genus was founded by Meyrick on a species of which he captured one specimen at Albany, Western Australia. It is interesting to note that another species, apparently belonging to the same genus, is to be found in Southern Queensland.

EOMYSTIS ACRIBES, n. sp.

15-16 mm. Head yellow; face yellow with two orange dots. Palpi yellow, base of second joint orange. Antennæ whitish annulated with fuscous, basal joint orange. Thorax yellow coarsely reticulated with orange. Abdomen ochreous. Legs whitish, anterior pair dull reddish; anterior tarsi with yellow annulations; middle tibiæ purple-fuscous. Forewings moderate; costa strongly arched, apex rounded, hindmargin straight, oblique; bright yellow coarsely reticulated with reddish-orange; two narrow purple-fuscous fasciæ, first straight from one-third of costa to middle of hindmargin, second bent inwards in disc from two-thirds of costa to anal angle, both dilated on costa and inner margin; a purple-fuscous line along basal half of costa, and another along hindmargin from beneath apex to anal angle; cilia purple-fuscous. Hindwings ochreous; cilia ochreous, slightly fuscous-tinged at apex.

Brisbane. Two specimens.

EURYPELTA, n. g.

Head with appressed scales, side tufts moderate, spreading, meeting above. Antennæ in male rather stout, with very short fine ciliations (one-fourth), pecten absent. Palpi moderate, second joint slightly exceeding base of antennæ, thickened with

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rough scales anteriorly. Thorax smooth. Forewings dilated, apex rectangular, hindmargin nearly straight. Abdomen broad. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings normal.

Differs from *Eomystis* in the short ciliations of the antennæ, and from *Eclecta* in the absence of a thoracic crest.

EURYPELTA EPIPREPES, n. sp.

Female, 23 mm. Head and face ochreous-yellow. Palpi ochreous-yellow, anterior surface tinged with dull reddish. Antennæ whitish annulated with fuscous. Thorax ochreous-yellow with a purple fuscous spot on each side. Abdomen ochreous. Legs ochreous, anterior and middle tibiæ and tarsi annulated with reddish. Forewings strongly dilated, costa strongly arched, apex rectangular, hindmargin nearly straight, very slightly oblique; ochreous-yellow irrorated thickly with dull reddish, markings dull purple fuscous; a transverse fascia close to base, its posterior edge very irregular and ill-defined; a squarish blotch on costa at one-third confluent with basal fascia, and sending an irregular transverse line to inner margin; a larger blotch on costa at two-thirds, from which proceed two wavy lines, the anterior ending abruptly before reaching inner margin, the posterior to anal angle; between the anterior of these lines and the second fascia is an irregular suffusion of dull purple fuscous; hindmargin outlined with the same; cilia ochreous-whitish, bases purple tinged. Hindwings and cilia ochreous.

Gympie, Queensland. One specimen taken by Mr. Illidge.

HEMIBELA, n. g.

Head with appressed scale, side tufts erect, spreading. Antennæ moderate (ciliations in male unknown), with strong pecten. Palpi, second joint reaching base of antennæ, thickened towards apex anteriorly with slight rough scales; terminal joint very minute, pointed. Thorax smooth. Abdomen stout. Forewings somewhat elongate; apex acute, slightly produced. Forewings with vein 7 to hindmargin, 2 from slightly before angle to cell. Hindwings normal.

Probably allied to *Eochrois*, but at once distinguished from any other genus by the extremely minute third joint of palpi.

HEMIBELA TRISPORA, n. sp.

Female, 26-28 mm. Head and thorax dull fuscous grey. Palpi fuscous, terminal joint pinkish. Antennæ fuscous. Abdomen ochreous. Legs whitish tinged with vinous, except posterior tibiæ. Forewings elongate; costa moderately arched, apex acute, slightly produced; hindmargin sinuate, oblique; dull

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fuscous grey, irrorated with whitish scales except at base; inner margin reddish-brown at base; three small circular spots in disc near base, ochreous-yellow outlined with reddish-brown; basal spot internal to fold, posterior and obliquely external to this lie the other two spots in a line with the first; hindmarginal edge tinged with purple; cilia pale reddish purple, on costa and anal angle fuscous. Hindwings uniform ochreous-yellow; cilia ochreous-yellow, on costa and towards anal angle tinged with fuscous.

A singular-looking insect, not resembling any other known to me.

Brisbane. Two specimens, both female, taken at light.

EUPHILTRA, *Meyr.*

I have two new species certainly referable to this genus. The antennal ciliations are $1\frac{1}{2}$ to 2.

EUPHILTRA THERMOZONA, n. sp.

14-15 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, extreme base of second joint dark fuscous. Antennæ dark fuscous. Thorax, anterior three-fourths black, sometimes containing two white spots; posterior fourth white. Abdomen fuscous, lateral margins and tuft ochreous. Anterior and middle tibiæ fuscous; tarsi ochreous-whitish; posterior tibiæ and tarsi ochreous-whitish. Forewings somewhat narrow; costa moderately arched, apex rounded, hindmargin very obliquely rounded; clear white; a triangular black spot at base of costa not reaching to inner margin; a moderately broad reddish-fuscous transverse fascia from two-fifths of costa to middle of inner margin, dilated towards inner margin; anterior edge concave, margined with fuscous; posterior edge convex, not margined; a second similar fascia of equal breadth from two-thirds of costa to anal angle, on costa and anal angle dark fuscous; anterior edge nearly straight, suffused; posterior edge sinuate, well defined. These two fascia are connected in disc by a short oblique fuscous line; an ill-defined triangular reddish-fuscous patch narrowly separate from hindmargin and second fascia, some scattered dark fuscous scales at apex and along hindmargin; cilia pale reddish-fuscous on costa and hindmargin, blackish-fuscous at apex and anal angle. Hindwings dark grey; cilia whitish-ochreous mixed with grey around apex.

Closely allied to *Euphiltra eroticella*, Meyr., but may be distinguished by the broader second fascia.

Brisbane. Three specimens.

EUPHILTRA ANGUSTIOR, n. sp.

12-14 mm. Head white. Palpi white, base of second joint

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dark fuscous. Antennæ dark fuscous. Thorax white with two fuscous dots; shoulder tufts, anterior half fuscous, posterior half white. Abdomen ochreous-fuscous. Anterior and middle tibiæ and tarsi blackish-fuscous; posterior tibiæ and tarsi ochreous-whitish. Forewings somewhat narrow; costa slightly arched, apex rounded, hindmargin very obliquely rounded; white, a black spot at base of costa, not reaching inner margin; costal edge reddish-fuscous from base to first fascia; a transverse reddish-fuscous fascia from costa at two-fifths to middle of hindmargin, contracted on disc above middle, broadest on inner margin; it contains a few darker scales, but edges are not outlined; anterior edge concave, posterior edge sinuate; a very ill-defined ochreous fascia from costa at two-thirds to anal angle, thickly and irregularly irrorated with dark fuscous; a very ill-defined ochreous patch between second fascia and hindmargin, also irrorated with dark fuscous; a few dark fuscous dots on hindmargin; cilia ochreous. Hindwings grey; cilia whitish-ochreous tinged with grey.

Readily distinguishable from the other two species of the genus by its white thorax.

Brisbane. Three specimens.

Zonopetala, Meyr.

The following have been taken near Brisbane:—

Zonopetala divisella, Walk.
" *clerota*, Meyr.
" *decisana*, Walk.
" *glauconephela*, Meyr.
" *quadripustulella*, Walk.

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Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XV.

CARABIDÆ.

TACHYS.

T. brightensis, Blackb. This name appears to represent the same species as *Bembidium striolatum*, Macl.; though the conclusion could not be arrived at from Sir W. Macleay's description, I think there is no doubt of its being correct, as Mr. T. G. Sloane has recently sent me some examples of *B. striolatum* (named by comparison with the type), which are undoubtedly my *T. brightensis*. The insect certainly cannot be placed in *Bembidium*; it seems structurally to be a *Tachys* (or very close thereto) although, as I have previously remarked, belonging to a group of Australian species, that perhaps might with propriety receive a distinctive generic name.

SILPHIDÆ.

CHOLEVA.

C. antipodum, Blackb. I have received from Mr. Simson an example of *Choleva* taken in Tasmania, which I think must be referred to this species, although it is a little more elongate, and parallel in form, and considerably darker in colour. I take this opportunity to improve my description of the mesosternal keel in this insect, which I said (Trans. Roy. Soc. S.A., 1891, p. 87) "scarcely emerges forward from between the coxæ;" a more correct expression would have been "becomes very feeble in front of the coxæ."

LAMELLICORNES.

PALMERSTONIA.

P. minor, sp. nov. (Fem.) Nitida; valde convexa; picea, supra glabra, clypeo lævi; prothorace quam longiori dimidio latiori, grosse minus crebre punctulato; elytris vix manifeste 4-costatis, obsolete seriatim punctulatis, stria suturali leviter impressa; subtus (abdomine fere glabro excepto) longe minus dense hirsuta. Long., 8 l.; lat., $4\frac{1}{4}$ l.

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The structural characters of this species seem to be quite the same as in *P. Bovilli*, Blackb., from which it may be at once distinguished by its much smaller size and coarsely punctulate prothorax; the coarse puncturation of the prothorax in contrast with the almost obsolete puncturation of the elytra and pygidium and the lævigate clypeus and scutellum gives the insect a very remarkable appearance. The propygidium (which is narrowly exposed) is opaque, and very finely strigose transversely; it is probably an organ of stridulation. The vertical clypeus (at a right angle with the hinder part of the head) and extraordinary labial palpi render this genus one of the most remarkable among the *Dynastides*.

N. Queensland; sent to me by Mr. French.

BUPRESTIDÆ.

STIGMODERA.

S. pictipes, sp. nov. (Mas.). Sat lata; minus convexa; flava, capite (nonnullorum exemplorum maculis quibusdam inter oculos exceptis) prothoracis disco basique scutello elytrorum basi summa antennis pedibus (femorum parte mediana excepta) prosterno medio mesosterni metasternique suturis maculisque nonnullis et coxarum maculis nonnullis aureo-viridibus, elytrorum fascia communi angusta postmediana et apice læte cœruleis; capite minus crebre vix fortiter (quam *S. tricoloratæ*, Waterh., minus crebre) punctulato, concavo; prothorace quam longiori duabus partibus (postice quam antice fere duplo) latiori, minus crebre minus fortiter (latera versus paullo magis crasse) punctulato, lateribus subtiliter crenulatis a basi circiter ad medium arcuatim divergentibus hinc ad apicem (vix sinuatim) convergentibus; elytris ad apicem late sinuato-subtruncatis (truncaturæ angulo interno vix producto, externo nullo), punctulato-striatis, interstitiis vix convexis sparsim minus subtiliter punctulatis, basi sinuata (vix manifeste angulata); corpore subtus (abdomine excepto) lanugine brevi argentea erecta vestito; sternis in medio sparsissime punctulatis; segmento ventrali apicali postice sinuatim truncato. Long., 14 l.; lat., $5\frac{1}{2}$ l.

Much resembles *S. tricolorata*, Waterh., but differs from that species (of same sex) by its form less convex and less narrowed behind, its head considerably less closely punctured, its prothorax much more evenly rounded on the sides (which are finely crenulate), its elytra having their base only *sinuate* (*i.e.*, wanting the angularity that is so well marked in *tricolorata* a little within the shoulder), their apex sinuately rounded without any spinose process whatever except a slight sutural projection and their interstices wider and flatter, its sterna much less closely punctured,

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its green markings distinctly of a golden tone, its prothoracic green marking continuous to the front margin, its post median and apical elytral fasciæ much narrower, and its femora yellow on their under-surface (except a narrow edging of golden-green colour).

W. Australia; near York; presented to me by Mr. French.

S. Caroli, sp. nov. (Fem.). Minus lata; minus convexa; supra rufa, capite prothorace (hoc maculis 3 magnis rufis transversim positis ornato) et elytrorum basi summa apiceque summo æneoviridibus; subtus æneoviridis, abdominis segmentis ultimis 3 rufo-maculatis; capite vix concavo linea mediana longitudinali impresso; prothorace quam longiori paullo plus quam duabus partibus (postice quam antice duplo) latiori, crebre fortiter (latera et basin versus magis grosse minus crebre) punctulato, lateribus crenulatis fortiter rotundatis (latitudine majori pone medium posita), basi quam elytrorum basis sublatiori; elytris ad apicem rotundatis, punctulato-striatis, interstitiis sat convexis sparsim punctulatis, basi sinuatim truncata; corpore subtus latera versus confertim fortiter inæqualiter punctulato (hic illic vermiculato-ruguloso), parte mediana inæqualiter sculpturata (sc. prosterno antice transversim fortiter rugato, hoc postice metasterno et abdominis basi sparsim punctulatis); segmento ventrali apicali postice rotundato, ante apicem transversim depresso.

Var. elytris et prothoracis maculis pallide testaceis, illis pone medium macula transversa communi nigra ornatis.

Maris (exempli descripti) prothorace concolori obscure æneoviridi, segmentis ventralibus (basali antice et in medio excepto) totis testaceis, segmenti ultimi parte apicali carente. Long., 12—14 l.; lat., 5—6 l.

I have no doubt of the three specimens before me appertaining to one species only. They seem to have been taken in company with the preceding. I have described the female in preference to the male on account of the latter being a considerably damaged and broken example. I cannot specify any *Stigmodera* to which this insect is very closely allied, though it bears a general resemblance to several; perhaps it comes nearest to *Menalcas*, Thoms., but that species, besides considerable difference in colour, is of narrower and more convex form, more pilose on the under-surface, with its prothorax much less strongly rounded on the sides, &c. In both the female examples before me the prothorax bears a large testaceous or red spot on each side nearly touching the lateral margin, and a smaller one on the hinder part of the disc separated by only narrow intervals on either side from the larger spots. As Mr. French's surname has already been used by me for a *Stigmodera* that was described almost simultaneously, but a

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little earlier, in Europe, I have called the present species after his Christian name, as so energetic a collector of the Australian *Buprestidæ* ought certainly to be commemorated in *Stigmodera*.

W. Australia; near York; presented to me by Mr. French.

S. oleata, sp. nov. (Mas.) Sat lata; minus convexa, nitida; cyaneo-nigra, elytris fascia communi sat lata ante-apicali læte sanguinea ornatis; capite leviter concavo, fortiter sat crebre punctulato; prothorace quam longiori tribus partibus (postice quam antice paullo plus quam duabus partibus) latiori, subtiliter sat sparsim (latera versus grosse rugulose) punctulato, lateribus anguste subdeplanatis (fere ut *S. Bonvouloiri*, Saund.) fortiter rotundatis, latitudine majori pone medium posita; elytris ad apicem rotundatis, punctulato-striatis, interstitiis sat convexis sparsim subtiliter punctulatis, basi sinuato-truncata; corpore subtus (abdomine excepto) lanugine brevi argentea erecta vestito; prosterno in medio sparsim subtiliter (latera versus confertim rugulose) punctulato; metasterno in medio sat crebre sat fortiter (latera versus confertim fortiter vix rugulose) punctulato; abdomine in medio sat sparsim (latera versus confertim rugulose) grosse punctulato; segmento ventrali apicali postice sinuatim truncato. Long., 11 l.; lat., 5 l.

Scarcely differs in respect of colour and marking from *S. Mniszechi*, Saund., but widely differs from it in almost every other character. Placed beside *S. Mniszechi* the present species is distinguished *inter alia multa* by the strongly rounded sides of its prothorax and the simply rounded apices, and regular striation of its elytra. Its shining surface causes it to appear as if it were polished with oil.

W. Australia; near York; presented to me by Mr. French.

S. oleata (?) (Fem.) Sat lata; minus convexa; nitida; supra ferrugineo-picea, prothorace obscuriori, hujus (parte basin versus excepta) elytrorumque lateribus aurantiacis; subtus nigra, vix cyanescens; segmento ventrali apicali rotundato, ante apicem transversim depresso; cetera ut *S. oleatæ* (maris). Long., 12—16 l.; lat., $5\frac{1}{4}$—$6\frac{1}{3}$ l.

Notwithstanding the extreme difference of colour and marking, I am disposed to believe that this is the female of the species whose male I have called *S. oleata*. I can discover no character on which to separate the two apart from their colour and markings, and from distinctions that are obviously sexual. I have seen three examples of this form (all females) and one of the other. They have all been forwarded to me by Mr. French as taken in the same locality (near York, W. Australia), and probably about the same time.

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The females bear a considerable resemblance in colour to *S. flavocincta*, Lap., *S. pubicollis*, Waterh., and some others thereto allied, but differ entirely *inter alia* by the smooth nitid surface of the prothorax and the faint sparse puncturation of its disc. In all the females before me the orange border of the prothorax ceases abruptly a little in front of the base, so that the hinder part of the margin is of the colour of the disc.

S. unicincta, Saund. I believe this to be the male, and *S. flavicollis*, Saund., to be the female of one species.

CURCULIONIDÆ.

GONIPTERINI.

OXYOPS.

O. placida, sp. nov. (Fem.) Angustior; picea, squamis fulvis et nonnullis niveis (his maculatim dispositis) vestita, antennis pedibusque obscure rufescentibus; oculis minus prominulis; rostro lato brevi (ut *O. bilunaris*, Pasc.); prothorace vix transverso, a basi antrorsum leviter arcuatim angustato (fere subcylindrico), sat crasse ruguloso et granulis nitidis crebre adsperso; scutello sat elongato; elytris striato-punctulatis, puncturis sat magnis squamis fulvis repletis, interstitiis angustis crebre granulatis, humeris parum prominulis. Long., 4 l.; lat., 2 l.

The snowy-white scales are thinly and singly sprinkled on the prothorax, and form a patch on and around the scutellum, as well as some very conspicuous spots on the elytra, the largest of which are placed (one on each elytron) on the third interstice, a little behind the middle. The principal characters of this species seem to be:—Rostrum short and wide, without carinæ or sulci; prothorax elongate (to a casual glance longer than wide), without any distinct constriction or longitudinal sculpture, and with its front angles but little developed, coarsely rugulose, and covered with strong, shining granules; elytra evidently depressed on the space within the third interstice, and without tubercles (except the subapical nodosity which is not strongly developed), their shoulders but little prominent; mesosternum only moderately prominent in front.

Victoria; taken by Mr. Froggatt near Bendigo.

O. pictipennis, sp. nov. (Fem.) Angustior; rufa, nigro-variegata, squamis silaceis et nonnullis albidis vestita; oculis minus prominulis; rostro minus brevi minus lato; capite inter oculos profunde sulcato; prothorace leviter transverso, sat crasse ruguloso et granulis nitidis crebre adsperso, carina longitudinali mediana abbreviata instructo, lateribus a basi

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antrorsum arcuatim convergentibus; scutello angusto; elytris striato-punctulatis, puncturis sat magnis, interstitiis sat angustis minus distincte granulatis, humeris parum prominulis. Long., 4 l.; lat., 2 l.

Not unlike the preceding in form and sculpture, but differing in several characters and in the colouring. The head and rostrum are black, the prothorax is dark-red, with the sides blackish, the elytra are dark-red, variegated with black, which forms irregular blotches. The antennæ are reddish, with the basal joint shining black, the legs red, more or less variegated with black, the under-surface black. The rostrum is markedly longer and narrower than that of the preceding species. The scales of the upper-surface are thinly, inconspicuously, and somewhat evenly distributed, and are slender and seta-like. The variegated colours of the derm render this species a conspicuous one. The mesosternum is distinctly, but not very strongly, prominent.

Victoria; taken by Mr. Froggatt near Bendigo.

ERIRHININI.

In part XIV. of this series of memoirs I expressed the intention of furnishing in this present part a tabulated statement of the distinctive characters of the Erirhinid genera known to be Australian. I regret exceedingly that it has proved impossible to carry out the intention in a fully satisfactory manner owing to difficulty in obtaining definite information about several of the imperfectly described genera of Mr. Pascoe. Under these circumstances, and in view of the need there is for a comprehensive treatise on these insects, I have thought it best to adhere to my intention of laying such a treatise before the Society, in spite of the knowledge that I may have wrongly identified some of Mr. Pascoe's genera, and that consequently the synonymy of my work may very probably have to undergo more or less correction eventually. At present the descriptions of the Australian *Erirhinini* are scattered through a multitude of memoirs, and are many of them extremely defective in character. The only attempt that has been made at a comprehensive treatment even of the genera consists in a tabulation published by Mr. Pascoe in the "Annals and Magazine of Nat. Hist." for 1872, dealing with only about two-thirds of the genera now known, including a number of genera that Mr. Pascoe afterwards stated he had erroneously located in the group, and dividing the group into sections, of some of which Mr. Pascoe himself said (perfectly correctly, I think) "they cannot be maintained satisfactorily, as some of the genera might be placed in either of them." That I have not succeeded in arriving at certainty in the identification of some of Mr. Pascoe's genera is not due to any carelessness or want of effort on

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my part. Some years ago I procured Mr. Pascoe's consent to compare a collection of generic types from my collection with his own types, and in due course forwarded the collection to him, accompanied with a second collection which I offered for his acceptance. After an interval I received back from him the specimens I had marked to be returned, but the only information he furnished was a statement that only one (of which he furnished the name) of the species was known to him. When Mr. Pascoe's collection passed into the possession of the British Museum, I wrote proposing to exchange types of species and genera that I had myself named against examples of those species, of which there were several examples in Mr. Pascoe's collection, and was informed that there were not many specimens of most of the species I desired, and that the proposal could not be accepted. There was nothing more to be done, for the offer to compare specimens I might send with Mr. Pascoe's types did not meet the difficulty; inasmuch as such a comparison would be unreliable unless made by someone who should be able to devote more time to minute examination of characters than it was to be expected the curators of the Museum could have at their disposal, and who at the same time should be familiar as a specialist with the distinctive characters of the Australian *Erirhinini*.

I am afraid Australian workers must make up their minds to the fact that if they are to postpone describing the insects of their country until they have ascertained them to be new by comparison with types (in the case of genera or species that have been insufficiently described in Europe) they will have to leave the work almost entirely to be done outside Australia. For my own part, I am convinced that the best course to adopt is to regard all descriptions that are insufficient for recognition as non-existent (unless one can get at the types through one's own friends), and although unquestionably the result will often prove to be that one's nomenclature will have to be subsequently corrected, I regard the author of the original insufficient description as the person on whom must be laid the responsibility for any confusion that may occur.

Returning to the subject of the Australian *Erirhinini*, the number of genera (including those I characterise in the present memoir, and excluding those originally attributed to the group by Mr. Pascoe, but subsequently removed from it by their author) is 48. Two species have been described (by Schönherr and Bohemann) as belonging to the genus *Erirhinus*; but this may be confidently regarded as an erroneous nomenclature, and therefore I do not consider that there is any ground for including *Erirhinus* among our Australian genera. Of the 48 genera, I have characterised 14 myself, four are Schönherr's, and two are

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Erichson's. The remaining 28 are Pascoe's. Among these there are only five (all of them Pascoe's) that I am not able to assign a place in a tabular arrangement; for which comparatively satisfactory state of things I am largely indebted to Mr. G. Masters, of Sydney, who furnished Mr. Pascoe with a large proportion of the specimens on which he founded his genera, and having retained examples in his own collection, has generously placed them in my hands during the time that I have been working on the present memoir. As the diagnoses of the five genera that I have been unable to identify are quite insufficient for distinction from the diagnoses of other genera, it is quite possible that I may have re-named some of them; nevertheless, as they all happen to have been founded on species from W. Australia, and none of my new genera are founded on W. Australian species, the probability is that they all represent forms that have not come under my notice. Although their characters are not sufficiently indicated by Mr. Pascoe to enable me to assign these genera a place in a general tabulation of the group, I have nevertheless been able to place them, on the strength of the few characters that their author mentions, in a short separate tabulation that I have drawn up. Subject to the remarks that will be found further on regarding the genus *Xeda*, I may add that the two tabulations I supply may be relied on absolutely as far as they go, for in the case of every genus that I have tabulated the characters have been taken either from an authentic type or from the author's own diagnosis. In no case have I introduced into the tabulation characters passed over by the author in silence unless I have had an authentic type before me. The name that would be assigned to any specimen by comparison with the tabulation is the generic name of that species, subject only to the inevitable condition that it may be a species requiring a *new* generic name on the ground of its differing from the type of the genus in respect of some character that is mentioned neither in the tabulation nor in the author's diagnosis.

There are several terms made use of in the tabulation that it is desirable to explain clearly. The first is the term "quadrangular" as applied to the rostrum; it signifies that the rostrum differs from the ordinary form (more or less cylindric) of that organ through its sides being abruptly vertical and thus at right angles to the upper surface. The next term is "subapical," or "submedian," or "subbasal" as applied to the scrobe of the rostrum, and which refers to the *front extremity* of the scrobe. The third term requiring definition is "divergent" or "divaricate" as applied to the claws, the former meaning that the dorsal border of each claw holds a direction *at right angles* to the direction of a longitudinal line passing down the tarsus (as in the

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Longicorn genera *Zygocera* and *Hebesecis*); the latter meaning that the dorsal border holds a direction more or less *continuing* the direction of the supposed longitudinal line.

Among the genera that I have tabulated there are two regarding the identification of which I feel that there is an element of doubt, and it seems necessary to indicate these genera and specify the reasons of the doubt in each case. The first is *Xeda*. I cannot say that I feel any *genuine* doubt about this, inasmuch as *X. amplipennis*, Pasc., is among the types lent me by Mr. Masters, and it agrees so perfectly with Mr. Pascoe's specific description and with his generic diagnosis in respect of all characters but one as to convince me that it is rightly named; but, nevertheless, its claws are divergent, whereas Mr. Pascoe calls them divaricate. I am of opinion that Mr. Pascoe probably did not use these terms exactly in the technical sense of Lacordaire, but interpreted "divaricate" as meaning "very widely," and "divergent" as meaning "less widely" directed apart. In most cases this interpretation would lead to the same results as M. Lacordaire's. Moreover, it is to be noticed that the claws are very easily forced into an unnatural condition in mounting, and that for confidence in deciding whether the claws of a specimen are divergent or divaricate it is necessary to be sure that they are not artificially displaced. The second genus which calls for remark is *Cyttalia*. The species that I have attributed to that genus depart from the characters specified by Mr. Pascoe in two respects: their femora are all dentate, whereas, according to the diagnosis, the hind femora only should be dentate; and their claws are divaricate, whereas they should be divergent. As regards the latter discrepancy, the remarks I have made above in respect of *Xeda* may perhaps apply here; and in regard to the former discrepancy I do not regard the exact number of dentate femora as important enough to be a generic character; indeed, Mr. Pascoe himself, in the case of the *Anthonomid* genus *Diapelmus*, does not hesitate to assign to it species that depart similarly from the characters assigned by its author. It is, I think, at any rate certain, that if the species I have called *Cyttalia* are not really congeneric with that on which the genus was founded, they cannot be referred to any other characterised genus, and therefore no great harm will result from their temporary location under a name that they are not really entitled to bear. The most remarkable character of *Cyttalia* I take to be the elongation of the antennal scape to the extent of its reaching back to the hind margin of the eye, and this character is present in the species I have assigned to the genus.

It is desirable to take this opportunity of referring to those species that I have previously described regarding which I have

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been led to modify my opinion by the fuller study of the *Erirhinini* that I have made for the purposes of this memoir. I am now strongly convinced that the character of the claws is of the first importance in this group; from which it results that two species which in the Proc. Linn. Soc., N.S.W., 1892, p. 147, I attributed to *Myossita*, having divaricate claws, cannot, in my opinion, rightly remain under that name. One of them *(M. munda)* is undoubtedly congeneric with the species that I attribute in this memoir to *Cyttalia*; the other *(M. crucigera)* I hesitate to place in *Cyttalia* on account of its antennal scape being too short and its general form too robust for that genus. I should treat it as the type of a new genus were it not that it agrees fairly with the characters Mr. Pascoe assigns to *Agestra*, but as the diagnosis of *Agestra* contains no reference to the claws, I am barred from calling it an *Agestra*. Consequently, I wish I had not described it, but as that, unfortunately, is a futile wish, I can only suggest that it be placed under *Agestra*, with the note added to its name, "? huj. gen." The third species on which I have to remark is that which I described in Proc. Linn. Soc., N.S.W., 1890, p. 584, as *Agestra punctulata*, expressing at the time grave doubt as to its real place. It is a very remarkable insect, for which a new generic name must be provided, but as I have satisfied myself by a microscopic examination that its claws are not really simple, I think, in spite of its *Erirhinid* facies, it must come out of the *Erirhinini* altogether, and I shall therefore reserve its fuller treatment for a memoir I hope to offer to the Society at an early date, dealing with it and some other allied forms of minute *Curculionidæ*, which at present I am unable to assign to any of M. Lacordaire's "tribes."

The following is a tabulation of the characters of all the *Erirhinid* genera as yet recorded as occurring in Australia, with the exception of five imperfectly characterised genera, of which I have been unable to procure the opportunity of examining a type, and which, therefore, I have placed in a separate tabulation :—

A. Tarsi not linear.
  B. Funicle of antennæ 7-jointed.
    C. Tarsi 4-jointed.
      D. Femora unarmed.
        E. Eyes distinctly on the head, as distinguished from the rostrum.
          F. Scrobes connivent.
            G. Ocular lobes distinct... ... ... Aoplocnemis.
            GG. Ocular lobes wanting ... ... Symbothinus.
          FF. Scrobes not connivent.
            G. Front tibiæ falcate.
              H. Basal joint of hind tarsi elongate; elytra not setose ... ... Œnochroma.

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HH. Basal joint of hind tarsi not elongate; elytra clothed with long erect setæ ... ... Olbiodorus.
GG. Front tibiæ not falcate.
H. Rostrum quadrangular.
I. Tibiæ mucronate at apex ... ... Plæsiorhinus.
II. Tibiæ not mucronate at apex ... Nemestra.
HH. Rostrum not quadrangular.
I. Scrobes subapical; joint 4 of tarsi equal to 1-3 together.
J. Rostrum constricted at base ... Anorthorhinus.
JJ. Rostrum not constricted at base Desiantha.
II. Not having both subapical scrobes, and joint 4 of tarsi as long as 1-3 together.
J. Front tibiæ not bicalcarate at apex.
K. Claws divergent.
L. Eyes finely granulate.
M. Scrobes lateral, submedian.
N. Rostrum elongate ... Paryzeta.
NN. Rostrum short ... Xeda
MM. Scrobes abruptly turned under rostrum.
N. Elytra smooth ... Olanæa.
NN. Elytra tuberculate ... Rhachiodes.
MMM. Scrobes subbasal ... Glaucopela.
LL. Eyes coarsely granulate
M. Basal joint of funicle not or little longer than 2nd joint ... ... Gerynassa.
MM. Basal joint of funicle much longer than 2nd joint.
N. Ocular lobes present ... Ethas.
NN. Ocular lobes wanting ... Omorophius.
KK. Claws divaricate.
L. Elytra not, or but feebly, bisinuate at base.
M. Eyes finely granulate.
N. Prothorax rounded at base.
O. Ocular lobes present ... Cydmæa.
OO. Ocular lobes wanting Dicomada.
NN. Prothorax bisinuate at base ... ... Erytenna.
MM. Eyes coarsely granulate.
N. Antennal club elongate, very distinctly articulate.
O. Apical ventral segment shorter than 2nd segment.
P. Apical joint of tarsi strongly exserted Epacticus.
PP. Apical joint of tarsi but little exserted ... Encosmia.

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OO. Apical ventral segment longer than 2nd segment.
P. Front of prosternum evenly emarginate — Eniopea.
PP. Front of prosternum very strongly emarginate in the middle ... — Empolis.
NN. Antennal club short, compressed, indistinctly articulate.
O. Front of prothorax (viewed from the side) strongly sinuous — Emplesis.
OO. Front of prothorax (viewed from the side) straight ... — Epamœbus.
LL. Elytra very strongly bisinuate at base ... — Themelia.
JJ. Front tibiæ bicalcarate at apex... — Hedyopis.
EE. Eyes as much on rostrum as on head ... — Phrenozemia.
DD. Femora (at least the hind femora) dentate.
E. Scape of antennæ not or scarcely passing the front of the eye.
F. Apical joint of tarsi more or less strongly exserted.
G. Prosternum normal.
H. Eyes finely granulate.
I. Scrobes connivent, or nearly so ... — Orpha.
II. Scrobes not nearly connivent.
J. Basal joint of tarsi very elongate... — Meriphus.
JJ. Basal joint of tarsi normal ... — Myossita.
HH. Eyes coarsely granulate ... ... — Agestra.
GG. Prosternum concave ... ... — Storeus.
FF. Apical joint of tarsi not (or scarcely) exserted ... ... — Cryptoplus.
EE. Scape of antennæ reaching the back of the eye... ... ... — Cyttalia.
CC. Tarsi 3-jointed ... ... — Thechia.
BB. Funicle of antennæ 6-jointed.
C. Tarsi 4-jointed.
D. Apical joint of tarsi well exserted.
E. Front tibiæ mucronate ... ... — Antyllis.
EE. Front tibiæ simple ... ... — Dyschænium.
DD. Apical joint of tarsi scarcely exserted.
E. Rostrum long and slender ... ... — *Endalus.
EE. Rostrum short and stout (not longer than prothorax) ... ... — Niphobolus.
CC. Tarsi 3-jointed ... ... — Misophrice.
BBB. Funicle of antennæ 5-jointed... ... ... — Anarciarthrum.
AA. Tarsi linear ... ... — Bagous.

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*It is doubtful whether this genus is really Australian (*vide* Tr. Roy. Soc. S.A., 1893, p. 315).

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Tabulation of Erirhinid genera not included in the general tabulation preceding :—

A. Femora unarmed.
  B. Scrobes not abruptly turned under the rostrum.
    C. Eyes finely granulate.
      D. Joint 2 of funicle short ... ... Nedyleda.
      DD. Joint 2 of funicle long ... ... Methone.
    CC. Eyes coarsely granulate ... ... Empira.
  BB. Scrobes abruptly turned under the rostrum ... Phædica.
AA. Femora dentate (at any rate the hind femora) ... Clisis.

SYMBOTHINUS.

S. nasutus, sp. nov. Elongatus, valde angustus; totus ferrugineus, squamis albidis plus minusve manifeste vestitus; rostro sat robusto, ad basin subito arcuato, quam prothorax parum longiori, sat fortiter punctulato et longitudinaliter lineis elevatis subtilibus instructo; capite prothoraceque sat crebre sat fortiter punctulatis; hoc vix transverso, antice posticeque angustato, lateribus modice arcuatis; elytris vix striatis, striis sat fortiter punctulatis, interstitiis subplanis; tarsorum articulo 3° sat dilatato, 4° minus exserto. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{2}{5}$ l.

About the most narrowly elongate *Erirhinid* known to me; the rostrum has a very peculiar curve at the base, of which a good idea may be formed from the figure of the rostrum of *Agnesiotis pilosula*, Pasc. (Journ. Linn. Soc., x. t. 18, fig. 6a), although of course the rostrum of *A. pilosula* has no resemblance in other respects to that of the present species. The unique example before me is but sparsely clothed with scales, those of whitish color lying chiefly along the suture of the elytra, but it is quite possible that a fresher specimen would be more densely scaly.

S. Australia; I do not know the exact habitat.

PARYZETA.

P. vittata, sp. nov. Ovalis; ferruginea, squamis concoloribus et nonnullis albidis vestita; his in capite condensatis, et in prothorace vittas 2 latas in elytrisque vittas plurimas (sc. in interstitii 5^{i} parte postica, in interstitii 6^{i} parte antica, in suturæ parte postica, et utrinque vittam obliquam ab humero versus suturam directam) formantibus; rostro (feminæ) quam prothorax fere duplo longiori, arcuato, ad basin compresso, subtiliter punctulato, apicem versus fere lævi; prothorace vix transverso, antice fortiter angustato, crebre sat fortiter punctulato, lateribus sat rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulo 2° quam 1^{us} multo breviori, quam 3^{us} sat longiori. Long. (rostr. incl.), 2 l.; lat., $\frac{1}{2}$ l.

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I have not seen an authentic type of this genus, but this species agrees well with Mr. Pascoe's generic diagnosis, except in its rostrum being very evidently compressed at the base (possibly only in the female), which is a character not mentioned by Mr. Pascoe. The elytra of the present species are at their widest at the base, where they are about half again as wide as the base of the prothorax, and whence they are narrowed hindward.

W. Australia; taken by E. Meyrick, Esq., near Albany.

OLANÆA.

O. metropolitana, sp. nov. Ovalis; ferruginea, antennarum clava et (versus apicem) tarsis infuscatis; squamis concoloribus et nonnullis albidis vel albido-viridibus vestita; his in prothorace trivittatim et in elytris ut vittæ plurimæ abbreviatæ (vitta suturali magis conspicua magis continua) condensatis; rostro (maris) quam prothorax fere sesquilongiori, sat cylindrico, leviter arcuato, punctulato, apicem versus fere lævi; prothorace sat transverso, antice modice angustato, ad apicem transversim depresso, crebre minus fortiter ruguloso, lateribus leviter rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulo 2° quam 1^{us} multo breviori, quam 3^{us} haud multo longiori. Long. (rostr. incl.), 2 l.; lat., $\frac{5}{8}$ l.

The white or greenish scales on the elytra of this species form numerous short longitudinal lines, that on the suture being the most conspicuous and most continuous.

N.S. Wales; taken near Sydney by Mr. Lea.

O. mentitrix, sp. nov. Ovalis; sat elongata; ferruginea, corpore subtus picescenti, nonnullorum exemplorum antennarum funiculo plus minusve infuscato; squamis albidis subtus dense æqualiter, supra subvittatim, vestita; setis erectis albis et nonnullis nigris sat sparsim instructa; rostro quam prothorax (maris parum, feminæ sat multo) longiori, leviter compresso, leviter arcuato, punctulato, longitudinaliter striolato, lateribus pone medium sulcos (his scrobes simulantibus) ferentibus; prothorace vix transverso antice parum angustato, lateribus sat rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulis 1° 2° que elongatis, hoc quam illo sat breviori. Long. (rostr. incl.), 2 l.; lat., $\frac{7}{10}$ l.

I refer this species to *Olanœa* as having (in combination with the general characters of *Xeda* and its allies) rostral scrobes abruptly directed to the underside of the rostrum. Nevertheless, it differs from the previously described *Olanœæ* in having a lateral furrow on either side of the rostrum (not unlike that of *Erytenna*), which at the first glance might be mistaken for the

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scrobe. The rostrum, moreover, is somewhat too long and compressed for an average *Olancea*. The general resemblance to *O. nigricollis*, Pasc., is so close that it would be difficult to determine an example of either if it had lost its rostrum except by the colour of the prothorax.

Victoria; Alpine district.

XEDA.

X. magistra, sp. nov. Robusta; sat parallela; picea, antennis pedibusque rufis; squamis ferrugineis albidisque intermixtis vestita; rostro quam prothorax vix longiori, punctulato, longitudinaliter leviter striolato; funiculi articulo basali quam sequentes 2 conjuncti subbreviori; prothorace fortiter transverso, antice valde angustato, sat crebre minus fortiter punctulato, lateribus fortiter arcuatis; elytris punctulato-striatis, interstiitis sat crebre sat subtiliter punctulatis, leviter convexis. Long. (rostr. incl.), $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

My example of this species is somewhat abraded. It is, nevertheless, apparent that a fresh example would be uniformly covered with fine ferruginous scales, thickly and somewhat evenly sprinkled with fine whitish scales, which, however, are a good deal condensed on the sides of the prothorax. The prothorax is extremely small in proportion to the size of the elytra.

S. Australia.

X. notabilis, sp. nov. Late ovalis; nigra, antennis (clava plus minusve infuscata excepta) tibiis tarsisque ferrugineis squamis (supra nigris, nonullis ferrugineis nonnullis albidis maculatim intermixtis, subtus albidis) dense vestita, et setis subtilibus sat brevibus suberectis instructa; rostro quam prothorax vix longiori, sat crasse punctulato et longitudinaliter striolato; funiculi articulo basali quam sequentes 2 conjuncti sat longiori; prothorace ut præcedentis sed magis fortiter punctulato; elytris punctulato-striatis, interstitiis punctulatis vix convexis. Long. (rostr. incl.), $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The black scales form the ground of the upper surface, and are sparsely and inconspicuously mottled with ferruginous scales. The whitish scales form conspicuous and well-defined markings, which consist of a basal spot on either side of the prothorax, and on the elytra a number of small patches limited to the interstices of the striæ, and grouping themselves into the following markings:—*(a)* A large spot around the scutellum running backward on the suture, and giving off at its hind extremity a narrow fascia on either side a little in front of the middle; *(b)* a narrow zigzag and more or less interrupted fascia a little behind the middle. The white scales on the elytra vary in extent; in some

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individuals those on the front part being so extended as almost to cover the basal half of the surface.

N.S. Wales; taken by Mr. Lea at Whitton.

RHACHIODES.

R. strenuus, sp. nov. Sat latus; fere subquadratus; piceus, rostro antennis pedibusque rufescentibus; squamis vestitus (his in elytrorum parte antica griseis, in parte postica fulvis, in spatio intermedio laterali triangulari albis); prothorace transverso crebre subtiliter ruguloso et sparsim granulato, haud tuberculis majoribus munito; elytris punctulato-striatis et tuberculis quinis fasciculatis ornatis (sc., 2 in interstitio 2°, 1 in 4°, 2 in 5°). Long. (rostr. incl.), $3\frac{2}{3}$ l.; lat., $1\frac{2}{3}$ l.

A rather short, wide and quadrate species, very distinct by its prettily-arranged squamosity. Regarding the grey scales as forming the ground-colour, the markings consist of bright fulvous scales clothing the front and sides of the prothorax and the apical one-third of the elytra, and a somewhat triangular patch of white scales on each elytron having its base about the middle of the lateral margin. The prothorax is devoid of tubercles, but a number of small granules are scattered confusedly over its surface. On the elytra there is a good-sized fasciculated tubercle on each side of the suture scarcely in front of its middle, another of about equal size near the apex of the fifth interstice, a very small one (scarcely more than a granule) in the front part of the fifth interstice, and two of moderate size on each elytron (on the second and 4th interstices respectively) a little behind the anterior of the two larger tubercles, forming with their fellows of the other elytron a continuous curved transverse series. The outward-directed prominence of the elytra below the shoulder is feebler than in most others of the genus.

N. Queensland.

R. forcipatus, sp. nov. Modice elongatus, elytris sat parallelis; piceus antennis pedibusque rufescentibus; squamis griseis sat æqualiter vestitus; prothorace vix transverso, crebre subtiliter ruguloso sparsim granulato, tuberculis 4 transversim positis munito; elytris punctulato-striatis et tuberculis quinis (ut speciei præcedentis positis) ornatis, angulo subhumerali fortiter prominenti. Long. (rostr. incl.), $2\frac{4}{5}$ l.; lat., 1 l.

This little species is nearer to *R. dentifer*, Bohem., than to any other described species, with which it agrees in the number and general arrangement of the tubercles on the prothorax and elytra, except as follows:—In both species the three tubercles placed on the middle part of each elytron may be regarded as enclosing with their fellows on the other elytron a common discal space which in *dentifer* is transversely oval, and in this species almost

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circular. This species also is smaller than *dentifer*, and its elytra are considerably less narrowed from the base hindward, being almost parallel; also the large subapical tubercles of the elytra are more erect and are distinctly curved in shape, their apices being directed towards each other; neither have I seen any example of *dentifer* in which the squamosity of the upper surface is of a uniform grey colour, as it is in my unique example of this insect. *R. multidentatus*, Chevr., from Tasmania, is described (in spite of its name) as having only *four* tubercles on each elytron, and as being very differently coloured from the present species. I think a *Rhachiodes* from Tasmania sent me by Mr. Simson is almost certainly *multidentatus*, but as it is open to doubt it is better not to mention other characters than those specified in Chevrolat's description.

N.S. Wales; Tweed R.

GLAUCOPELA.

G. fusco-marmorea, sp. nov. Ovalis; minus lata; picea, rostro antennis pedibusque (his, præsertim femoribus, plus minusve æneascentibus) testaceis; squamis albidis et nonnullis nigro-fuscis variegatis dense vestita (squamis nigro-fuscis in prothorace vittas latas 2 et in elytris maculas incertas formantibus); rostro quam prothorax subbreviori sublævi parum subulato; prothorace leviter transverso antice fortiter angustato; elytris punctulato-striatis, interstitiis sat planis. Long. (rostr. incl.), $1\frac{1}{6}$ l.; lat., $\frac{1}{2}$ l.

This genus is easily recognisable among the Australian *Erirhininæ* by its subbasal scrobes. The present species may be at once distinguished from *G. unicolor*, Pasc., by its testaceous antennæ and from *G. varipes*, Blackb., by its smaller size, evidently narrower build, and different colors and markings. In *G. varipes* the upper surface is evenly (though not very closely) clothed with shining whitish scales, and has no pattern, while in the present species the whitish scales are of an opaque tone, and are so intermingled with blackish scales that there is a very distinct though very variable pattern, consisting of two wide dark vittæ on the disc of the prothorax, and a number of smaller or larger dark spots or blotches (in some examples exceeding the lighter coloring in extent) dispersed over the elytra.

N.S.Wales; taken near Sydney by Mr. Lea.

G. distincta, sp. nov. Præcedenti valde affinis; minus parallela; squamarum pallidiorum colore magis viridi, his magis nitidis; corpore supra setis subtilibus sat elongatis fulvis sat sparsim ornato; prothorace sat fortiter transverso. Long. (rostr. incl.), $1\frac{1}{3}$ l.; lat., $\frac{7}{10}$ l.

As I have seen only two examples of this insect, and the

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species is very likely to be variable in the arrangement of its squamosity, it is useless to describe the pattern very minutely; in general the markings resemble those of the preceding species, but are much less clearly defined, and the lighter colored scales are more nitid, and have a distinctly greenish tone. The insect may, however, be at once distinguished from all other previously described Australian *Erirhinini* by the following characters in combination: antennæ testaceous, scrobes subbasal, upper surface clothed with fine hairs of a bright fulvous color (in addition to the scales).

N.S. Wales; taken by Mr. Lea at Whitton.

ETHAS (gen. nov. *Erirhininarum*).

Corpus squamosum; rostrum elongatum (maris quam feminæ brevius), gracile, arcuatum; scrobes laterales, fere rectæ, (maris multo feminæ vix) ante medium rostrum positæ; scapus oculum vix attingens; funiculus 7-articulatus; oculi ovales minus fortiter granulati; prothorax subcylindricus, basi leviter vel vix bisinuata, lobis ocularibus bene determinatis; scutellum minutum; elytra quam prothorax sat latiora; prosternum antice fortiter emarginatum, ante coxas sat elongatum; coxæ intermediæ approximatæ; femora mutica; tibiæ anticæ intus ad apicem breviter mucronatæ; tarsorum articuli basales 3 minus elongatæ, ex ordine latiores, 3° bilobo, 4° modico sat exserto; unguiculi divergentes; segmentum ventrale 2^{um} quam 3^{um} 4^{um} que conjuncta (et quam ultimum) vix longius.

The granulation of the eyes in this genus is somewhat intermediate in degree of coarseness, being evidently less coarse than in *Emplesis*, *Gerynassa*, &c., but not so fine as in *Cydmœa* and its allies. On the whole I think the genus is best placed with those having the eyes *coarsely* granulated. The following characters in combination (without regarding the eyes) will distinguish it from most if not all the other named Australian *Erirhinid* genera:—2nd joint of funiculus scarcely longer than 3rd, ocular lobes prominent, claws divergent. The rostrum is much like that of *Dicomada*.

E. varians, sp. nov. Ovalis (sat late); piceus, rostro pedibusque plus minus ve rufescentibus; squamis fumosis et nonnullis albidis confuse intermixtis vestitus; rostro quam prothorax (maris plus quam paullo, feminæ permulto) longiori, gracili, arcuato, supra longitudinaliter carinato; funiculi articulo basali quam 2^{us} multo longiori et crassiori, hoc quam 3^{us} vix majori; prothorace quam latiori fere longiori, albido trivittato, antice modice augustato, lateribus modice rotundatis; elytris punctulato-striatis, interstitiis sat planis. Long. (rostr. incl.), 1$\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

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Remarkably like *Cydmæa diversa*, Blackb., but at once distinguishable from that species by its claws being (not divaricate, but) divergent. All the examples that I have seen are closely scaled and present the appearance of a smoky-black surface confusedly and somewhat variably mottled with whitish. On the prothorax the whitish scales generally form three fairly well-defined vittæ, and the scales of the under surface are entirely whitish. The sculpture of the prothorax and elytra (except the elytral striæ) is entirely hidden by squamosity.

Victoria; sent by Mr. French; examples from Sydney (Mr. Lea) seem quite identical.

E. eruditus; sp. nov. Præcedenti affinis; minor; minus latus; squamis albidis in elytris versus apicem condensatis et signaturam communem literam V simulantem (hac ab humeris ad suturam mediam extensa) formantibus. Long. (rostr. incl.), $1\frac{2}{5}$; lat., $\frac{2}{5}$ l.

The distinct pattern formed by the scales on the elytra (which do not seem at all possibly a mere variation of the marks of the preceding species), together with a manifest difference in size and build, satisfy me that this is a good species. The extremities of the arms of the V-like mark on the elytra touch the shoulders, while the apex rests on the suture at about its middle.

N.S. Wales; near Sydney.

OMOROPHIUS (gen. nov. *Erirhininarum*).

Corpus sqamis parvis adpressis dense vestitum; rostrum sat gracile valde elongatum, arcuatum, nitidum, subcylindricum, supra sparsim punctulatum, vix strigatum; scrobes submedianæ laterales; scapus oculum attingens; funiculus 7-articulatus; oculi grosse granulati; prothorax parvus leviter transversus, basi subtruncata, lobis ocularibus nullis; scutellum minutum; elytra quam prothorax multa latiora, ovalia; prosternum antice emarginatum, ante coxas modice elongatum; coxæ intermediæ inter se approximatæ; femora mutica; tibiæ anticæ vix mucronatæ; tarsorum articuli basales 2 sat breves (2° quam 1^{us} breviori), 3° alte bilobo, 4° quam ceteri conjuncti vix breviori; unguiculi divergentes; segmenta ventralia 3^{um} 4^{um} que conjuncta quam 2^{um} sublongiora, ultimo sat brevi.

This genus is near *Gerynassa*, but differs from it *inter alia* by the much longer claw-joint of the tarsi, the much longer rostrum, and much shorter second joint of the funiculus.

O. seriatus, sp. nov. Ferrugineus, rostro (nonnullorum exemplorum) antennarum clava et unguiculis infuscatis; squamis pallide fulvis et nonnullis albis vestitus; rostro (feminæ) quam prothorax duplo longiori; antennis modicis, funiculi

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articulo basali quam sequentes 3 vix breviori; prothorace vix transverso, subquadrato, antice leviter angustato, supra sat crebre sat subtiliter rugulosa, lateribus parum arcuatis; elytris punctulato-striatis, interstitiis subcostatis setis brevibus albis adpressis seriatim ornatis. Long. (rostr. incl.), $2\frac{1}{2}$ l; lat., 1 l.

The upper surface is very uniformly clothed (in the examples before me) with small, close-set, inconspicuous pale fulvous scales, the sides of the prothorax and the shoulders, however, bearing scales that are somewhat conspicuously more pallid than those of the general surface. The scales of the under surface are whitish. The shape and general facies of this insect recall *Xeda* to the mind; the rostrum, however, is very different, the eyes are coarsely granulate, the prothorax is much narrower at the base than the elytra and not much narrowed in front, the claw-joint of the tarsi much longer, &c.

N.S. Wales; taken by Mr. Lea near Gosford.

CYDMÆA.

C. mixta, sp. nov. Sat late ovalis; picea, antennis tibiis tarsisque plus minusve rufescentibus; squamis fulvis albidisque intermixtis vestita; rostro quam prothorax (maris vix, feminæ manifeste) longiori, minus compresso; funiculi articulo 1° quam 2^us^ multo longiori; prothorace leviter transverso; elytris punctulato-striatis, interstitiis vix convexis. Long. (rostr. incl.), $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

The arrangement of the scales in this species are (as usual in the Australian *Erirhinini*) fairly constant in colour, but variable in arrangement. In all the specimens I have seen (taken by Mr. Lea and myself) the fulvous and white scales are so arranged as to present the appearance of the fulvous scales forming the ground and the whitish scales being condensed in the form of small spots rather closely and evenly distributed over the upper surface—in some examples without any more pattern-like arrangement, in others running into irregular ill-defined transverse series (especially on the hinder part of the elytra).

This species somewhat resembles *crassirostris*, Blackb., but is of somewhat narrower build, with a much less compressed rostrum, more reddish antennæ and tibiæ, and very different markings.

N.S. Wales; in the neighborhood of Sydney.

ENCOSMIA.

E. cornuta, sp. nov. Minus elongata; ferruginea, squamis silaceis plus minusve vestita; rostro quam prothorax vix longiori, punctulato; funiculi articulis basalibus 2 sat elongatis (basali

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quam 2^{us} sat longiori), ceteris brevibus; prothorace vix transverso, antice sat angustato, supra crebrius ruguloso, lateribus sat arcuatis; elytris punctulato-striatis, interstitiis subplanis crebre subtilius rugulosis, interstitio 3° postice tuberculo magno conico nigro armato. Long. (rostr. incl.), 2½ l.; lat., 1 l.

I place this species in *Encosmia* with considerable hesitation on account of its great difference in facies from the previously described species of the genus, compared with which it is a much larger and more robust insect, having a large tubercle on each elytron at the summit of the posterior declivity almost as in *Rhachiodes*. To a casual glance it has much the appearance of a *Rhachiodes*, but its divaricate claws, and eyes comparatively coarsely granulate, at once separate it from that genus. In structural character I can find no distinction from *Encosmia*. I have not described in detail the arrangement of the pale reddish scales with which it is clothed, as I have only a single specimen before me, and descriptions of the scales in an *Erirhinid* founded on anything short of a good series of specimens is generally misleading. The example before me has fairly closely-set whitish and yellowish-red scales on its underside and shoulders, but it is quite likely that it may be abraded and that in fresh specimens the scales are more generally distributed, and perhaps variable in pattern. The tubercles on its elytra distinguish this species readily from all others yet described which approach it structurally.

Tasmania.

EMPLESIS.

E. interioris, sp. nov. (Mas.) Sat angusta; ferruginea, squamis albidis sat æqualiter vestita; funiculi articulo 2° quam 1^{us} multo breviori quam 3^{us} parum longiori, articulis ceteris brevibus; rostro modico, arcuato, quam prothorax paullo longiori; prothorace leviter transverso, in parte antica summa manifeste constricto; elytris punctulato-striatis, interstitiis vix convexis; tibiis anticis breviter mucronatis. Long. (rostr. incl.), 1⅕ l.; lat., ⅖ l. (vix).

Very distinct from its previously described congeners by its very small size together with its uniform ferruginous color and evenly distributed whitish squamosity. The prosternum is gently concave in front of the coxæ.

Central Australia; near Oodnadatta.

THEMELIA (gen. nov., *Erirhininarum*).

Corpus dense squamosum; rostrum sat elongatum minus robustum sat cylindricum sat arcuatum; scrobes antemedianæ laterales; scapus oculum vix attingens; funiculus 7-articulatus; oculi subfortiter (quam *Emplesis* minus, quam

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Rhachiodis magis, fortiter) granulati ; prothorax sat elongatus, basi vix manifeste bisinuata, lobis ocularibus nullis ; scutellum distinctum ; elytra quam prothorax modice latiora, subcordiformia, ad basin conjunctim fortiter bisinuata ; prosternum antice fortiter emarginatum, ante coxas sat fortiter elongatum ; coxæ intermediæ inter se minus approximatæ ; femora mutica ; tibiæ antice ad apicem parum distincte mucronatæ ; tarsorum articuli basales 2 breves, 3° alte bilobo, 4° minus fortiter exserto ; unguiculi divaricati ; segmenta ventralia 3^um^ 4^um^ que conjuncta quam 2^um^ parum breviora, ultimo 2° sat æquali.

An isolated genus, as it appears to me, on account of the strong bisinuation of the front of its elytra ; a little resembles *Eniopea* in general appearance.

T. inconspicua, sp. nov. Ferruginea, antennis apicem versus infuscatis ; squamis ferrugineis griseisque intermixtis vestita ; rostro quam prothorax (maris vix feminæ sat multo) longiori, squamis griseis parce vestito ; funiculi articulo 1° sat elongato, 2° paulo breviori quam sequentes sat longiori ; prothorace quam latiori longiori, a basi antrorsum leviter rotundatim angustato ; elytris elongato-cordiformibus, quam prothorax sat latioribus, punctulato-striatis, interstitiis subconvexis (3° mox pone medium minute tuberculato). Long. (rostr. incl.), $1\frac{3}{5}$ l. ; lat., $\frac{3}{5}$ l.

At once recognisable by the small tubercle (scarcely more than a fair-sized granule) on the third interstice of each elytron immediately behind the middle. The convexity of the elytral interstices is scarcely noticeable except in an abraded specimen. The prevalent squamosity forming the ground color of the upper surface is of a fulvo-ferruginous tone, the markings (or pattern) being formed by scales of a bluish-grey color ; these latter are condensed on the sides of the prothorax, and are vaguely blotched over the elytra, being, however (in examples not at all abraded), condensed to form two oblique ill-defined subtransverse lines on each elytron—one at, the other in front of, the middle. The scales of the under surface are entirely bluish-grey. A narrow line of scales, varying in color from testaceous-grey to bluish-grey, runs down the centre of the prothorax.

N.S. Wales ; Blue Mountains, &c.

CYTTALIA.

C. tarsalis, sp. nov. Oblonga ; lætefulva, meso- et meta-sternis antennarum clava et tarsorum apice nigricantibus ; pilis subaureis supra (in elytris longitudinaliter seriatim dispositis), griseis infra, vestita ; rostro prothoraci longitudine æquali, haud carina mediana instructo ; prothorace transverso,

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antice sat constricto, lateribus leviter arcuatis; scutello albo-piloso; elytris quam prothorax fere duplo latioribus, punctulato-striatis, interstitiis convexis; femoribus dentatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l.

Distinguished from *C. griseipila*, Pasc., by its smaller size and by all its femora being dentate; from *C. munda*, Blackb. (originally described as *Myossita* as noted above), differing *inter alia* by the smaller tooth of its front femora, by its entirely fulvous legs and antennæ (except the antennal club and the apex of the tarsi) and by the linear arrangement of the elytral pilosity; and from *Diapelmus ventralis*, Pasc., and *Erichsoni*, Pasc. (with which I cannot but think it congeneric), by its longer rostrum. The tooth on the front femora is very slightly defined, that on the intermediate well marked, that on the hind very strong and large.

Victoria.

C. Sydneyensis, sp. nov. Elongata; testaceo-brunnea, corpore subtus rufescenti, antennis (clava nigra excepta) pedibusque pallide testaceis; pilis albidis (in rostro elytrisque longitudinaliter seriatim dispositis) vestita; rostro prothoraci longitudine æquali, haud carina mediana instructo; prothorace vix transverso, antice sat constricto, lateribus arcuatis; scutello obscuro; elytris quam prothorax fere duplo latioribus, punctulato-striatis, interstitiis minus convexis; femoribus anticis vix manifeste, intermediis modice, posticis fortiter, dentatis; tarsis elongatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{2}{5}$ l.

The second ventral segment is scarcely so long on the middle line as the third and fourth together. The tarsi are distinctly longer and more slender than in the species mentioned above (except *C. griseipila*, which I have not seen, but which is described as a larger insect with its anterior four femora unarmed); its dark colored scutellum distinguishes it from all except *C. munda*, from which it differs *inter alia* by its pale testaceous legs.

I have seen examples (also from New South Wales) of somewhat darker color (the upper surface dull brown, the metasternum blackish, the legs less pallid) and scarcely so elongate, which I cannot satisfy myself represent a distinct species.

N.S. Wales; near Sydney.

MISOPHRICE.

M. dispar (mas.), sp. nov. Oblonga, postice latior; rufo-testacea, capite tarsis antennarum clava et nonnullorum exemplorum rostro plus minusve infuscatis; squamis albis et nonnullis læte viridibus vestita (his in capite, prothorace, elytrorum

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lateribus suturaque, et metasterni lateribus dispositis); rostro sat nitido, arcuato, sat gracili, supra leviter longitudinaliter sulcato (sulcis grosse sparsim punctulatis), quam prothorax vix longiori; antennis ad medium rostri insertis; scapo apice subito valde clavato; funiculi articulo 1° magno (quam scapi clava majori) subgloboso vel late piriformi, 2° brevi gracili, ceteris parvis moniliformibus (sed quam 2us manifeste latioribus); prothorace leviter transverso, a basi antrorsum leviter arcuatim angustato, crebre sat crasse ruguloso; elytris fortiter subgrosse punctulato-striatis, interstitiis leviter convexis; prosterno ante coxas brevi parum emarginato. Long. (rostr. incl.), $\frac{9}{10}$ l.; lat., $\frac{3}{10}$ l.

Of the five examples that I have seen of this minute species, three have deformed antennæ, with some of the joints of the funiculus so soldered together that the funiculus appears to consist of only 4 or 5 joints; in the specimen described the 6 joints of the funiculus are all well defined. The S. Australian *M. oblonga*, Black., is very like the present insect, but is larger, not dilated behind the middle of the elytra, and devoid of the metallic light-green scales which clothe the head prothorax sides and suture of the elytra and sides of the metasternum in *M. dispar*. *M. munda*, Blackb., has the second joint of its funiculus longer, and also is of the same form as *M. oblonga*. *M. submetallica*, Blackb., and *setulosa*, Blackb., have the prothorax of dark color, &c., &c. The other described species are all quite different, and need not be compared with this one.

N.S. Wales; taken near Tamworth by Mr. Lea.

M. spilota (fem.), sp. nov. Oblonga, postice latior; rufo-testacea, capite pectore tarsis et maculis nonnullis in elytrorum parte postica positis piceis; squamis albis setiformibus sparsim vestita; rostro quam prothorax sat longiori, basin versus fere ut præcedentis sculpturato ultra medium fere lævi; antennis pone medium rostri insertis; scapo apice modice clavato; funiculi articulo 1° elongato-piriformi (quam sequentes 3 conjuncti vix breviori), articulis 2° 3° que inter se sat æqualibus subparallelis, ceteris submoniliformibus; prothorace transverso, sat grosse sat confertim sat rugulose punctulato, lateribus sat fortiter arcuatis; elytris fortiter sat crasse punctulato-striatis; prosterno ante coxas sat elongato, parum emarginato. Long. (rostr. incl.), $1\frac{1}{3}$ l.; lat., $\frac{2}{5}$ l.

It is noteworthy that of this and the preceding (both from one locality) all the examples before me seem to be females and males respectively (I have made *sure* in respect to one of each). Nevertheless, I cannot bring myself to believe that they pertain to a single species, as the differences seem to me far too great to

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be merely sexual, *M. dispar* being, as indicated above, very closely allied to, and superficially very like, several previously-described species, whereas the present one, in respect of its general appearance, is one of the most distinct species of the genus, and its structural characters are very different from those of *M. dispar*.

N.S. Wales; taken about the Tweed R. (Tamworth, &c.) by Mr. Lea.

M. quadraticollis, sp. nov. Fem. Sat angusta, postice latior; picea, antennarum scapo et pedibus (genubus tarsisque exceptis) rufis, elytris (basi excepta) rufescentibus; squamis piliformibus albidis disperse vestita; rostro quam prothorax paullo longiori, arcuato, nitido, apicem versus (a latere viso) subacuminato; antennis pone rostri medium insertis; funiculi articulo basali quam sequentes 3 conjuncti paullo breviori; prothorace leviter transverso, subquadrato, antice parum angustato, pone marginem anticum transversim leviter impresso, sat grosse punctulato; elytris sat fortiter punctulato-striatis; prosterno ante coxas modice elongato, parum emarginato. Long. (rostr. inel.), $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

Nearest to *M. submetallica*, Blackb., but without any metallic scales and with the prothorax very much less narrowed towards the front. The elytra also (in the unique example before me) are very differently colored, being pitchy black at the base, and becoming a little reddish in the posterior two-thirds of their length.

S. Australia; near Quorn.

BAGOUS.

B. clarenciensis, sp. nov. Rufus, vertice rostri basi corpore subtus et tarsis piceis; rostro quam prothorax (maris vix feminæ sat manifeste) longiori; prothorace pone apicem sat fortiter constricto; elytris striatis, interstitiis leviter convexis. Long. (rostr. incl.), 1 l. (vix); lat., $\frac{2}{5}$ l. (vix).

Easily recognisable among its described congeners by its very small size and the bright brick-red color of its whole upper surface except the head and the extreme base of the rostrum.

N.S. Wales; taken at the Clarence River by Mr. Lea.

EURHYNCHINI.

EURHYNCHUS.

E. bispinosus, Boisd. I have an example of this species from tropical Queensland. I think it has not been previously recorded as occurring in Australia.

E. splendidus, sp. nov. Niger, pedibus et antennarum clava

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ferrugineis; prothorace elytris et corpore subtus squamis piliformibus coccineis ornatis [his densissime condensatis et vittas 4 (sc. 2 in corpore supra, 2 in corpore subtus) latas formantibus]; rostro quam prothorax paullo longiori, basi grosse apicem versus subtiliter punctulato; prothorace transversim fortiter strigato, lateribus rotundatis; elytris suturam versus grosse latera versus subtiliter punctulato-striatis, juxta scutellum utrinque crista parva et mox pone medium spina perlonga granulata munitis; antennarum clava quam articuli 1—8 conjuncti vix breviori, clavæ articulo ultimo quam præcedentes 2 paullo longiori; femoribus anticis dente parvo armatis. Long. (rostr. incl.), 5 l.; lat., $1\frac{1}{3}$ l.

This is a remarkably handsome species. Its color is black, with the club of the antennæ and legs reddish; on either side, on both the upper and under surface, there is a vitta of dense scarlet squamosity. The vittæ of the upper surface commence at the front margin of the prothorax, and terminate close to the apex, but are interrupted by the elytral spines and again near the apex, so that the extreme apical portion forms a small spot, separated from the vitta by a narrow interval. The vittæ of the under surface commence on the front of the prosternum, and are continuous to the apex of the second ventral segment, where they terminate. The mesosternal process is also clothed with scarlet squamosity. The elytral spines are very long (about as long as the distance from their base to the base of the elytra). The great length of the antennal club is probably a sexual character of the male.

N. Queensland; presented to me by Mr. Masters.

Cyladini.

CYLAS.

C. turcipennis, Bohem. I have lately received from Mr. Cowell an example taken near Cairns of this widely distributed species. No species of the genus has previously been recorded as found in Australia; the capture is, therefore, of considerable interest.

Haplonycini.

HAPLONYX.

H. ornatipennis, sp. nov. Ferrugineus, plus minusve picescens; squamis piceis albidis ochraceisque vestitus, his inter notas alias fasciam insignem ochraceam communem arcuatam mediam in elytris formantibus; supra æqualis (*i.e.*, nec tuberculatus nec fasciculatus); capite rostroque obscuris, hoc depresso lato recto longitudinaliter strigato quam prothorax vix

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longiori; antennis læte rufis, nonnullorum exemplorum ad clavæ apicem infuscatis; prothorace conico modice transverso, lateribus vix arcuatis; elytris fortiter punctulato-striatis, puncturis in striis quadratis, interstitiis sat planis (his exemplorum abrasorum rugulosis magis convexis); femoribus omnibus subtus, et tibiis anterioribus 4 intus, unidentatis. Long. (rostr. excl.), $1\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l. (vix).

A pretty little species, easily recognisable (among the *Haplonyces* of the group devoid of tubercles and of fascicles on the upper surface and having a short depressed rostrum) by the very conspicuous bright red median fascia on its elytra; this fascia is of a curved form with its convex side directed forward. Besides the above-mentioned fascia the scales form the following markings (which, however, seem to be more easily abraded than the median fascia, as abraded examples generally have the median fascia even if all the other scales have been lost):—On the prothorax, a dark median patch and two indistinct whitish vittæ on each side; on the elytra a bright ochreous basal fascia and more or less bright ochreous coloring about the sides and apex, and a white scale on each interval between puncture and puncture in the elytral striæ (these white scales, however, very deciduous, and therefore wanting in all but very well preserved examples). The rostrum does not appear to differ much sexually.

Victoria; sent by Mr. French.

Longicornes.

PHORACANTHA.

P. lætabilis, sp. nov. (Mas.). Castanea, elytris flavis castaneo-notatis, femorum parte apicali infuscata; capite prothoraceque pube subtili grisea confertim vestitis; antennis subtus parum fimbriatis, quam corpus multo longioribus, articulo 3° haud supra canaliculato quam 4^{us} manifeste longiori, articulis 3—6 extus breviter spinosis; prothorace vix transverso, in disco tuberculis 5 vel 7 munito, lateribus tuberculo magno conico-obtuso armatis; scutello dense flavo-hirto; elytris quam prothorax plus quam quadruplo longioribus, a basi ad medium grosse [hinc (subito) ad apicem subtiliter] punctulatis, ad apicem truncatis et bispinosis (spinis subæqualibus), latitudine majori longe pone medium posita, segmento ventrali apicali sinuato-truncato. Long., 13 l.; lat., 4 l.

The castaneous markings on the elytra consist of a spot round the scutellum, the whole suture, a narrow zig-zag fascia in front of the middle, and a wide fascia behind the middle which is narrowly prolonged hindward along the lateral margin to meet the castaneous suture so as to enclose a very large spot of the

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yellow ground color. The inequalities on the prothorax are much like those of *P. recurva*, Newm., but the prothorax (as well as the head) is entirely clothed with close ashy-grey pubescence (except on the central elongate elevation) which covers the tubercles and conceals the puncturation.

N. Queensland; in the collection of Mr. French.

STRONGYLURUS.

S. minor, Blackb. In describing this species (Proc. L. Soc. N.S.W., 1893, p. 199) I omitted to remark on the fact that its head is shorter than in the other species of *Strongylurus*. It is possible that this may point to its requiring a new generic name. Its antennal characters are inconsistent with its being placed in any of the known *Strongylurid* genera having the head short. The basal joint of its hind tarsi is longer than in most species of *Strongylurus* and less flattened beneath, but this is a character that *S. ceresioides*, Pasc., shares with it. For the present, at any rate, it seems to me undesirable to separate it from *Strongylurus*.

NOTOMULCIBER (gen. nov. *Lamiinarum*).

Caput verticale, fronte transverso-quadrata; oculi emarginati, fortiter granulati; antennæ (? feminæ) quam corpus longiores, articulo 1° haud cicatricoso sat brevi (quam 6^{us} fere breviori) piriformi, 3° quam 4^{us} fere sesquilongiori, 4° quam sequentes longiori, his inter se sat æqualibus; prothorax transversus, postice fortiter bisinuatus, ad latera fortiter tuberculatus; scutellum transversum; elytra elongata minus convexa, ad apicem conjunctim rotundata; pedes mediocres, femoribus sat robustis leviter fusiformibus (posticis quam abdomen multo brevioribus), tibiis quam tarsi multo longioribus (intermediis emarginatis), tarsis brevibus depressis; prosternum ante coxas elongatum, pone coxas declive et triangulariter dilatatum; mesosternum antice subverticale (parte subverticali longitudinaliter carinata); acetabula intermedia extus aperta.

It will be seen from the above characters that this genus is structurally allied to *Mulciber*, differing from it notably in its much less strongly emarginate eyes. M. Lacordaire places *Mulciber* in the *Homoneides*, a Malayan "Groupe" not previously recorded as occurring in Australia. In M. Lacordaire's tabulation of his "second division" of *Lamiini* [Gen. Col. IX. (2), pp. 413, &c.] the insect on which I found this genus would fall into that "Groupe."

N. Carpentariæ, sp. nov. (Mas. ?) Sat nitidus; piceus; pube subtili obscura (hac pube ferruginea conferta maculatim

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variegata) vestitus, antennis (basi excepta) tibiarum apice tarsisque rufescentibus; capite sparsim grosse punctulato, inter antennas late leviter concavo, linea longitudinali profunde impresso; prothorace inæquali, ut caput (disco medio lævi excepto) punctulato, trans basin transversim depresso; elytris ad basin quam prothoracis basis sat latioribus, quam prothorax quadruplo longioribus, obsolete 3-costatis, sat fortiter sat crebre (apicem versus magis obsolete) punctulatis, humeris quadratis (angulis humeralibus summis rotundatis); corpore subtus sparsim subtiliter punctulato; prosterno ante coxas fortiter transversim rugato. Long., 11 l.; lat., 4 l.

This is a typical *Lamiid* structurally (having the vertical head, acutely pointed palpi, and obliquely furrowed front tibiæ, characteristic of the sub-family), but it has much more resemblance to the *Cerambycides* in facies; indeed, on a casual glance it might almost be taken for a *Pachydissus*. I have omitted, in describing it, to characterise the vestiture of the antennæ, as I suspect that it is much abraded in the type (which, however, is in good condition generally), the joints being fringed beneath with very distantly *and irregularly* placed fine hairs; the basal four joints are nitid and glabrous, the rest very finely and closely pubescent.

In the specimen I am describing the lateral tubercles of the prothorax and the shoulders of the elytra are slightly rufescent. There is an excessively fine greyish pubescence, which probably in a perfectly fresh example covers all or nearly all the surface (in the type it is wanting here and there, probably through slight abrasion), and also a much more conspicuous, though still fine, rusty-brown pubescence is present forming spots and patches. The rusty-brown pubescence is condensed round the eyes, in small spots on the face, and on the sides of the prothorax; on the elytra it forms a number of more or less connected blotches, the largest of which are a spot behind the shoulder and two spots near the apex of each elytron. As far as I can see, without injuring the specimen, the derm underlying these blotches is a little reddish in color.

Cape York; in the collection of C. French, Esq.

ORICOPIS.

O. guttatus, sp. nov. Obscure brunneus, pube subtili paullo dilutiori vestitus et setis erectis albis sparsissime ornatus, elytris guttis discoidalibus binis (setis niveis densissimis formatis) variegatis; capite sparsim punctulato; antennis quam corpus paullo longioribus, subtus sparsim ciliatis, articulis basi rufescentibus, 3° quam 4^{us} parum breviori quam 1^{us} sat longiori; prothorace supra planato tuberculato (sc.

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tuberculo parvo nitido mediano, utrinque ad disci latera tuberculo magno bifido, et in lateribus veris tuberculo conico, armato), sparsim punctulato; elytris sparsim (apicem versus obsolete) punctulatis, vix manifeste costatis, ad apicem truncatis, in parte basali tuberculis parvis nitidis ornatis (horum nonnullis biseriatim positis). Long., 6 l.; lat.,

This species is easily recognisable by the two conspicuous spots of snowy-white pubescence on the disc of each elytron—the anterior and larger one a little in front of, the other a little behind, the middle.

I do not think I can be mistaken in referring this insect to *Oricopis*, although I have not previously seen an example of the genus. It agrees perfectly with the characters assigned by Mr. Pascoe, except that I can scarcely consider the intermediate cotyloid cavities open externally. Their aperture is certainly only very narrow. However, to regard them as closed would involve placing the insect among species where it would seem quite out of place, and in all other respects it seems very close, even specifically, to the typical *Oricopis*. Its divaricate claws, intermediate tibiæ externally emarginate, tubercled mesosternum, and remarkably tubercled prothorax seem to forbid its generic separation from *O. umbrosus*, Pasc.

N.S. Wales; Tweed River District.

SYBRA.

S. Mastersi, sp. nov. Picea, pube fulva (hac grisea brunnea que marmorata) vestita; elytris macula communi (hac pube nivea densa vestita, suturam mediam late tegenti et in humerum marginemque lateralem posticum ramos obliquos utrinque emittenti); capitis prothoracisque sculptura sub pubem abdita; prothorace nonnihil inæquali, subtransverso, postice quam antice vix latiori; elytris sat fortiter subseriatim (apicem versus magis obsolete) punctulatis, ad apicem anguste sat acute productis, partis producta margine suturali sat fortiter concavo. Long., 7 l.; lat., $2\frac{1}{5}$ l. (vix).

This is a very pretty insect, and appears to be very distinct from all the numerous species of the genus previously described. It is clothed with fulvous pubescence slightly mottled with brown and white; this pubescence is very evenly distributed on the upper surface, except that each elytron is traversed by a well-defined wide band of white pubescence which, commencing on the shoulder, runs obliquely to the suture, and on reaching it runs along it to considerably behind its middle, when it turns outward and runs obliquely to the lateral margin, which it nearly touches a little in front of the apex. The under-surface is much clothed with greyish-white pubescence.

N. Queensland; presented to me by Mr. G. Masters.

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THE BLATTARIÆ OF AUSTRALIA AND POLYNESIA.

SUPPLEMENTARY AND ADDITIONAL DESCRIPTIONS AND NOTES.

By J. G. O. TEPPER, F.L.S.

[Read March 6, 1894.]

In the treatise with the above title, published in Vol. XVII. of the Transactions of the Royal Society of S.A., some 30 species were only inserted by name, owing to the descriptions being inaccessible for me at the time. Since then I have been fortunate enough to procure Saussure's great work, entitled "Melanges Orthopterologiques" (2 vols., 1863, 1878), and am now enabled to make up the deficiency almost completely, and to correct the nomenclature.

Of those 30 species only three remain unsettled, viz., *Apolyta gracile*, Butler, *Polyzosteria Sedilloti*, Burm., and *P. variolosa*, Burm.; one name—*Epilampra mediventris*, Sauss.—disappears, as being evidently a misprint for *E. nudiventris*, Sauss., a synonym of *E. inguinata*, Stal., and another—*Ectatoderus*—has to be removed, owing to the genus belonging to the Gryllidæ and not the Blattariæ, while five proved to be synonymous of described species. This leaves 20, of which more or less complete descriptions are supplied as extracts and translations from the above work.

The later parts of Saussure's work also supplied five additional species, whose habitat is recorded as in the Australian regions, enriching the record by three genera, of which the descriptions are given.

In the meantime some more specimens have come to hand, of which the major part was contributed by my valued friend, C. French, Esq., F.L.S., and hailing from Victoria, N.S. Wales, and Queensland, among which were some new species (notably the most gigantic kind for Australia known to me). The descriptions of these and also Saussure species are given in the order adopted in the first part, and denoted by the page numbers heading the paragraphs.

Of the 193 species originally recorded, 7 are removed, and 14 new species added, which brings up the total to 200 for Australia and Polynesia, of which only those described by Walker require special verification.

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PHYLLODROMIDÆ.

(Page 38.*)

TEMNOPTERYX (*Blatta*) OBSCURA, *Sauss.* (Mel. Orth., I., 61).

"Large, brownish testaceous. Head brown, with five yellow dots. Pronotum and elytrum brownish chestnut. Elytra corneous, punctulate, much abbreviated, apex rounded, sutural margins overlapping. Coxæ testaceous, base varied with brown.

Length of elytra (sex ?)	8·5 mm.
Length of pronotum	6·5 "
Width of pronotum	5·5 "

Habitat—India (?), Samoa."

TEMNOPTERYX COULONIANA, *Sauss.* (Mel. Orth., I., 22, 60, fig. 14.)

"Brownish black. Body rather elongate. Pronotum broad, semiarbicular, shining. Elytra much abbreviated, sulci distinct, costal veins raised. Abdomen of male carinate. Cerci very large, acute. Supra-anal lamina of female trigonal, of male narrow, truncate, emarginate at apex. Styles very short.

	Male.	Female.
Length of body	15 mm.	16 mm.
Length of elytra ...	8 "	7.5 "
Length of pronotum ...	4·6 "	—
Width of Pronotum ...	6·4 "	—

Habitat—New Holland" (Australia).

PARATEMNOPTERYX AUSTRALIS, *Sauss.* (Mel. Orth., II., 93, fig. 22).

"Brownish black, paler below. Elytra chestnut-brown, rounded, truncate contiguous along the sutural margin, and exceeding the second abdominal segment. Claws without arolia.

Length of body (female)	16 mm.
Length of elytra	6·5 "
Length of pronotum	5 "
Width of pronotum	7 "

Habitat—Melbourne, Victoria."

(Page 39.)

TAMNELYTRA HARPURI, *Tepp.* New locality.

Two specimens, viz., a mature female and a half-grown larva, labelled Victoria, were presented by Mr. C. French. Coll. S.A. Museum.

(Page 44.)

PHYLLODROMIA (*Blatta*) BITAENIATA, *Sauss.* (Mel. Orth., I., 63).

"Ferruginous testaceous. Antennæ thick, brown, first two joints testaceous. Pronotum trapezoidal, margins pellucid, disk

* This and following references are to Royal Soc. Trans., S.A., Vol. XVII.

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yellowish ferruginous, with indistinct rusty-brown streaks and two brown bands. Elytra of female much shorter than the the abdomen, of the male much longer, pellucid; second (scapulary) vein brownish ferruginous, costal margin broadly whitish, pellucid. Abdomen with all intra-marginal bands brown.

	Male.	Female.
Length of body	8 mm.	8 mm.
Length of elytra	8 "	6·6 "
Length of pronotum ...	2·5 "	2·5 "
Width of pronotum ...	3·5 "	3·6 " "

Habitat—Australia.

PHYLLODROMIA (*Blatta.*) SIMILIS, *Sauss.* (Mel. Orth., I., 65).

"Testaceous ferruginous. Pronotum trapezoidal, pellucid; disk bordered testaceous ferruginous, middle pellucid. Elytra testaceous, dotted with ferruginous. Wings hyaline, discoidal vein with three branches. Abdomen ferruginous. Supra-anal lamina of male trigonal, truncate. Subgenital lamina broad, deeply cleft into two lobes, both margins with distinct small teeth at the base. Styles rudimentary.

Length of body (male)	9 mm.
Length of elytra...	9·2 "
Length of pronotum	2·5 "
Width of pronotum	3·9 "

Habitat—New Holland" (Australia).

PHYLLODROMIA ALBOVITTATA, *Sauss.* (Mel. Orth., II., 95).

"Pale testaceous orange. Antennæ black. Pronotum elliptical, disk yellow, margin pellucid. Wings subhyaline, reddish; discoidal vein of female with four, of male with two or three branches. Abdomen blackish, segments beneath bordered with white, apex with a red spot.

	Male.	Female.	
Length of body	8·5 mm.	11 mm.	
Length of elytra... ...	9·3 "	9 "	
Length of pronotum ...	3·7 "	2·7 "	(?)
Width of pronotum ...	2·3 "	4·2 "	(?)

Habitat—New Holland" (Australia).

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APOLYTA PELLUCIDA, *Klug.*

A. australis, Sauss. (Mel. Orth., I., 18, 69, fig. 21).

This species was first described by Saussure as *Ellipsidion*, and later as *Thyrsocera australe*. A specimen, presented by Mr. C. French, agrees with Saussure's figure and description, excepting

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the (apparently) much duller color; it is, in fact, scarcely pellucid.

Habitat—Victoria (loc. nov.). Collection S.A. Museum.

(Page 48.)

APOLYTA RETICULATA, *Sauss.* (Mel. Orth., I., 70).

"Mesonotum black, varied with yellow; metanotum and base of abdomen orange. Wings with discoidal vein emitting 4—5 branches towards the apical borders. Female short and broad, much smaller than the male. The black disk of the pronotum often with traces only of red instead of a band. Last ventral segment large, margins raised. Cerci reddish. Elytra scarcely exceeding the abdomen by 2 mm. Trochanters, tibiæ, and tarsi yellow.

Habitat—New Holland" (Australia). (Dimensions not given).

APOLYTA AURANTIA, *Sauss* (Mel. Orth., I., 70). *Bl. vestita, Burm.*

"Brown. Front and vertex orange, antennæ black. Pronotum pellucid, disk orange. Elytra testaceous orange. Wings brownish, margin orange. Legs yellow, coxæ, femora, and tarsi brownish at the apex. Abdomen bordered yellow, segments beneath and the coxæ with white.

Length of body (female) ... ... 10 mm.

Habitat—New Holland" (Australia).

By a misprint at p. 48 of my paper, "*A. reticulata*" is repeated instead of "*aurantia.*" It is doubtful if this is really the species meant by Burmeister's extremely short description: "Body wholly brown, pronotum and elytra pale yellow, brown towards apex." But even Saussure's descriptions are insufficient to identify the species of this difficult genus with any degree of certainty.

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ISCHNOPTERA AUSTRALIS, *Sauss.* (Mel. Orth., I., 27, fig. 17; II., 101).

Ischnoptera australica, Br., according to Saussure.

From a comparison of the two descriptions one would scarcely be able to say that both applied to the same species, as they mostly refer to different details. Saussure only records "New Holland" as the habitat.

ISCHNOPTERA FULVA, *Sauss.* (Mel. Orth., I., 28, 71, fig. 18; II., 102).

"Yellowish brown, resembling *I. australis.* Pronotum bisulcate, margins subopaque. Elytra and abdomen broad, anal area truncate at apex.

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Length of body (male)	 19	mm.
Length of elytra	 23	"
Length of pronotum	... ... 5–5·3	"
Width of pronotum	... ... 7·3–8	"

Habitat—New Holland" (Australia).

ISCHNOPTERA TERMITINA, *Sauss.* (Mel. Orth., I., 29, 71, fig. 19).

"Small, narrow, much elongated, ferruginous hyaline. Head concealed, vertex and front brown, with two whitish ocelliform spots. Pronotum small, elliptic, subarcuate behind; disk piceous, bisulcate, laterally pellucid. Elytra very long and narrow, not contracted towards the apex; margins scarcely curved.

Length of body (male)	 11	mm.
Length of elytra	 13	"
Length of pronotum	... ... 2·7	"
Width of pronotum	... ... 3·4	"

Habitat—New Holland" (Australia).

ISCHNOPTERA TRIRAMOSA, *Sauss.* (Mel. Orth., I., 72).

"Testaceous. Head spotted with brown. Pronotum opaque, deflexed laterally, nearly straight behind, disk varied with brownish ferruginous. Wings hyaline, foremargin subtestaceous, discoidal vein with three apical branches, and emitting four or five rudimentary ones towards the anal area. Abdomen clouded with brown.

Length of body (female)	 13	mm.
Length of elytra	 13	"
Length of pronotum	 3	"
Width of pronotum	... ... 4·5	"

Habitat—Brisbane" (Queensland).

EPILAMPRIDÆ.

(Page 56.)

PARAPHORASPIS (?) CASTANEA, *spec. nov.*

Chestnut-brown, shining, almost concolorous. Pronotum nearly black, rounded behind, very finely impressed punctate, with some larger distantly scattered pits, posteriorly an impressed lyrate figure in the middle, but only visible with a lens. Elytra subcorneous, flat, very closely, finely, and, near the margin, irregularly veined. Wings smoky. Femora spinose. Supra-anal lamina of female longer than wide, lateral margins straight, hind-margin deeply and broadly emarginate, lobes acutely angular. Cerci large, lanceolate, acutely acuminate, much exceeding the lamina. Coll. S..A. Museum.

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Length of body (female)	...	...	22	mm.
Length of elytra ...	...	...	17	"
Length of pronotum	...	...	5	"
Width of pronotum	...	...	8	"

Habitat—Howbulan, Victoria (presented by C. French, F.L.S.).

A single female and rather damaged, but the characters are so different from all others known to me, that it is only provisionally placed in this genus.

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Epilampra mediventris, Sauss.

Evidently a misprint for *E. nudiventris*, a synonym of *E. in quinata*, Stål, and thus represents no species.

EPILAMPRA (*Homalopteryx?*) PECTINATA, *Sauss.* (Mel. Orth., I., 91).

"Testaceous brown, dotted all over with reddish brown. Head prominent, longitudinal band brown. Pronotum transverse, much arched, shining, angular behind. Elytra as long as the abdomen, apex broad. Wings concolorous, anterior area broad at the apex, obtuse; veins straight, incurved at apex; discoidal vein with three pectinate apical branches, five incomplete ones, and five to seven rudimentary. Abdomen brownish above, below with scattered brown granules. Supra-anal lamina rounded, slightly emarginate. Subgenital lamina with the margin produced in the middle.

Length of body (female)	...	...	16	mm.
Length of elytra ...	...	...	16	"
Length of pronotum	...	...	6	"
Width of pronotum	...	...	8	"

Habitat—New Holland" Australia.

Not having seen specimens I leave the species as placed by its author, but it scarcely fits into the genus on account of the structure of the supra-anal lamina, &c.

EPILAMPRIA TATEI, *spec. nov.*

Brown, varied (except pronotum). Head *prominent*, blackish; antennæ, sides of face, and mouth-parts yellowish, a curved brown bar between the antennæ, a pale yellow rounded spot on the inner side of each of the sockets of the antennæ. Pronotum slightly truncate in front, produced behind, slightly impressed punctate; hindmargin *without the usual raised striæ;* margin all round narrowly reflexed, broadly pale yellow in front, remainder brown. Legs pale yellowish; tibiæ brownish. *Femora unarmed.* Elytra much exceeding the abdomen; radial vein emitting two straight branches posteriorly near the middle; ulnar vein *curving parallel to the anal and emitting several dichotomous branches towards the*

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apical border; anal vein gradually curved and terminating near the middle of the hindmargin; membrane brown, translucent,; margin of costal area dark brown, larger part of costal vein bordered broadly with black, radial vein dark brown at and beyond the middle; *basal half of veins impressed punctate;* basal half of elytra with a row of minute brown dots between most of the veins. Wings with a distinct, but small, triangular area, pale translucent; veins dark brown, transverse veinlets whitish. *Abdomen short, broad,* piceous above, paler at the base, testaceous beneath; margin broadly black. Supra-anal lamina of female *large, flat; median furrow distinct, hindmargin semicircular, entire.* Subgenital lamina *very large, transverse, arcuate; hindmargin subsemicircular.* Cerci lanceolate, *much shorter than the lamina.* Collection S.A. Museum.

Length of body (female)	...	...	17·5 mm.
Length of elytra	...	...	18 "
Length of pronotum	...	...	3·5 "
Width of pronotum	...	...	6·5 "

Habitat—Yam Creek, Northern Territory of South Australia (presented by Prof. R. Tate, F.L.S.).

There is a single, but perfect, specimen before me which, however, differs in so many details from other species known to me that it probably requires a separate genus for its reception, the characters of which are indicated by the italicised portions of the above description. The species resembles *Nauphoëta* to some extent, but differs in the structure of the anal appendages. The place of the suggested genus would be probably between *Phoraspis* and *Epilampra.*

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GEOSCAPHEUSIDÆ.

GEOSCAPHEUS ROBUSTUS, *Tepper.*

Since the publication of my first paper I have received specimens of this species from two more localities very far apart, and showing the wide distribution, viz., from the neighbourhood of Oodnadatta in Central Australia, and Victoria. Of the latter place they are in the possession of Mr. C. French. Those of the former were presented by Mr. J. Lipman, Adelaide, during September, 1893. Of the ten specimens three had survived the rough transit by post in almost a loose packing, and were put in a tin with a thick layer of compressed moist soil, a mixture of clay and sand. They at once exhibited their appreciation of the new quarters, and also their surmised habits, by burrowing into the soil head foremost and concealing themselves. When thus engaged they employ not only head and forelegs, but also the other two pairs, appearing to *sink* into the soil without raising

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any considerable quantity above the surface, nor do they appear to form an unobstructed tunnel, as a part of the dislodged soil appears to be pressed against the sides, while the remainder fills up the space behind the insect. A few seconds suffice them to get out of sight, reminding the observer very much of the *modus operandi* of the Australian Anteater *(Echidna hystrix)*. When turned out on a firm surface in bright daylight they ramble and run about actively without exhibiting any alarm or fear. As food they were offered earthworms, grubs, caterpillars, breadcrumbs, woodlice, and a Tenebrionid beetle (*Pterohelæus*, sp.). The first three disappeared successively, but the last were not touched, nor were some specimens of *Julus* molested. One of the three died after a few days, while the remaining two (a pair) were still alive more than three months after receipt, although for weeks they would not eat anything that could be procured, owing to the absence of worms in the dried-up soil. That in which they lived was, however, kept moist by being wetted at intervals.

It is to be observed that neither these nor the species of *Polyzosteria* and *Anamesia* as defined by Brunner and myself possess any odour, while *Platyzosteria*, &c., are notorious for evil smelling.

GEOSCAPHEUS GIGANTEUS, *spec. nov.*

Brownish red, convex, shining, very large and bulky. Body elongate oval. Head large, very smooth, flat, finely punctate, brown, anterior border blackish, remainder of face slightly excavated; clypeus red, labrum varied blackish and brown, base pale ferruginous; sides black, an oblique groove, and the sockets of the antennæ pale ferruginous; palpi and antennæ chestnut-brown; basal joints of antennæ obconical, curved, longer than the two following together; second and third joints subequal, more than twice as long as any of the succeeding ones, remainder very short, annular, diminishing in diameter. Pronotum transverse, subtrigonal, conspicuously and broadly hooded in front in the female, incrassated and raised into a short emarginate ridge in the male, deeply and rugosely excavated in the middle; disk blackish, finely punctate, margin more distinctly impressed punctate, hindmargin nearly straight, angles much rounded, not produced. Meso- and meta-notum very shining hind-angles prominently produced, rotundate. Wingless. Fore-legs similar to *G. robustus;* femora with three spines, anterior ones shortest, median longest; dactile spines of tibiæ very long and stout, base wrinkled, all black. Abdomen with a few minute distinct dots in the disk, margin with coarser, more numerous pits; hindangles of segments triangularly but slightly produced, not acute ,those of seventh segment alone produced as an erect

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stout spine; hindmargin of sixth segment of male with six or seven small obtuse teeth on each side; ventral disk red, margin black. Supra-anal lamina transverse, depressed, very much wider than long, coarsely impressed punctate, hindmargin convex, entire. Cerci very short, broadly oval, ciliate (male). Subgenital lamina of male small, transverse, hindmargin rounded. Collection S.A. Museum.

	Male.	Female.
Length of body ...	35–37 mm.	50–52 mm.
Length of pronotum ...	9–10 "	14–15 "
Width of pronotum ...	16–17 "	25–26 "
Width of abdomen ...	20–21 "	30–34 "

Habitat—North Queensland (presented by C. French, Esq., F.L.S.).

This splendid species differs from *G. robustus* in very much greater size, paler color, smoother texture, different form of pronotum and supra-anal lamina, the hindangles of the seventh segment of the female alone bearing a curved spine, and the dentate hindmargin of the sixth segment of the male. The dissimilarity in size of the two sexes, of which two pairs were before me, is very remarkable.

The species is the largest and bulkiest Blattarid among the Australian representatives so far as I am acquainted with them, and is probably not exceeded by any species elsewhere.

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ANAMESIA (?) FULVORNATA, *spec. nov.*

Flat, elongate-oval, ochreous above, brown beneath, shining. Head prominent, labrum yellow. Pronotum subsemicircular, lateral margins rugose with coarse impressed dots, hindmargin nearly straight, disk with distant impressed dots and brownish-red figures resembling oriental letters in a circularly-bounded area. Meso- and meta-notum similar, distantly spotted with brownish-red. Legs and whole underside concolorous. Abdomen impressed, dotted; hindangles scarcely angular, basal half of segments brown. Supra-anal lamina of male transverse, quadrilateral; lateral margin with a few minute spines, hindmargin unarmed, slightly concave. Cerci deficient (?). Collection S.A. Museum.

Length of body (male)	25–26 mm.
Length of pronotum	5– 5·4 "
Width of pronotum	11–12 "

Habitat.—Howbulan, Victoria (presented by C. French, Esq., F.L.S.).

The specimens examined consist of two somewhat dilapidated

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males, deficient of antennæ, part of legs, and also the cerci and styles. They resemble *A. Eastii* in the texture of the dorsal surface, but are much smaller, less bulky, and the markings quite different. The species scarcely fits into the genus, having apparently some affinities with *Dasyposoma castanea*, Sauss., but is placed here till an opportunity offers to compare specimens of both, and better examples obtained.

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Polyzosteria cuprea, Sauss. Mel. Orth., I., 5.

This was placed by me through misconception under *Platyzosteria*, but is recorded and cancelled by Saussure as synonymous with POLYZOSTERIA MACULATA, *Brunner*, already described.

Polyzosteria bicolor, Sauss. (*ibid* II., 79; II., 112)=PLATYZOSTERIA LIGATA, Br.

A variety (?) is also described with the margins of the third thoracic segment wholly yellow from "New Holland."

Polyzosteria biglumis, Sauss. (*ibid*)=PLATYZOSTERIA SUBAPTERA, Br.

Polyzosteria consobrina, Sauss. (*ib.*)=PLATYZOSTERIA ATRATA, *Erichs.*

Polyzosteria analis, Sauss. (*ib.*)=PLATYZOSTERIA MELANARIA, *Erichs.*

Polyzosteria pulchella, Sauss. (*ib.*)=POLYZOSTERIA LIMBATA, *Burm.*

The changes are indicated by Saussure himself.

POLYZOSTERIA MITCHELLI, *Angas* (*Sauss.*, Melb. Orth., II., 106).

A full description is given of this species (figured but not described by Angas), but evidently of spirit specimens, apt to be distorted and always discolored.

In regard to another species, an observation is made by the same author assigning one of the older names to synonymy, on account of insufficient description, and with which I also agree, viz. :—

"*Blatta verrucosa*, White, in Appendix to Gray's Journal of Two Expeditions in N.W. and W. Australia, is probably the same as POLYZOSTERIA REFLEXA, *Brun.*"

POLYZOSTERIA FRENCHII, *spec. nov.*

Elongate-elliptical, dull blackish with a greenish tinge. Head dark, impressed punctate, foremargin of clypeus reddish-brown and a red spot on each side, labrum brown, palpi pale, antennæ a little darker, both ciliate, basal joint of latter brown. Pronotum semicircular, slightly hooded, foremargin not reflexed, slightly

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produced ; lateral margins narrowly reflexed, anterior half narrowly brown, posterior half as well as the whole of the meso- and meta-notum broadly yellow and coarsely impressed punctate, disk minutely impressed punctate, with two distinct small pits near the middle, a short ridge in front of the pits and various small smooth areas more or less rounded. Meso- and meta-notum similar, lateral lobes distinctly produced, and two shallow pits on either side anteriorly. Legs brown, coxæ bordered pale-yellow, femora pale at apex. Abdomen dull-blackish, very finely punctate, lateral margins very narrowly yellow, angles of segments 2–6 acute, slightly produced, of segment 7 forming acute, triangular, flat, yellow spines, lateral margin bordered very narrowly with yellowish, an intramarginal row of oblong, smooth impressions, segments 7–8 narrowly exposed. Ventral segments bronzy-blackish, lateral and posterior margins pale-yellow to brownish-red. Supra-anal lamina transverse, trapezoidal, hindmargin truncate, depressed medially, yellow, lateral margins concave, angles acute. Cerci broadly lanceolate, concave above, bordered yellow, much exceeding the lamina, apex shortly acuminate. Subgenital lamina shiningly smooth, brown, broadly bordered with yellow, hindmargin broadly and rotundately emarginate. Styles stout, rather long, almost apically inserted. Collection S.A. Museum.

	Male.
Length of body	37 mm.
Length of pronotum	9·3 "
Width of pronotum	21 "
Width of abdomen	23 "

Habitat.—Victoria (presented by C. French, Esq., F.L.S.)

The species, of which there is a single male, resembles *P. patula* to a certain extent, but it is longer and narrower, and the genital appendages are very different, besides the difference in colour and markings.

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PLATYZOSTERIA MELANARIA, *Erichs.*

Var: *grandis*, Sauss., Mel. Orth. II., 109.

"Thick, slender, black above, chestnut beneath. Antennæ reddish, base brown. Supra-anal lamina exceeding the cerci, trigonal, apex emarginate, seven spines on either side.

Length of body (female)	43 mm.
Length of pronotum	10 "
Width of pronotum	15·1 "
Width of abdomen	17 "

Habitat.—Melbourne (Victoria).

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PLATYZOSTERIA HEYDENIANA, *Sauss.* (Mel. Orth., I., 76).

Periplaneta Heydeniana, Sauss. *(ibid).*

"Slender, depressed, brownish-testaceous. Body with brownish-testaceous streaks and intramarginal lines, margin brown. Abdomen brownish behind and beneath. Elytra scale-like, narrow, apex rounded.

Length of body (both sexes)	... ..	19 mm.
Length of pronotum	... ...	5·6 "
Width of pronotum	... ...	7·6 "

Habitat.—New Holland" (Australia).

PLATYZOSTERIA LITURATA, *Sauss.* (Mel. Orth., II., 108, fig. 36.

"Brownish-black, a little wider behind than in front. Thorax and abdomen ornamented on both sides with broad yellow streaks ending with the fifth abdominal segment. Head yellow, a trigonal facial spot chestnut. Legs yellow-testaceous. Posterior tibiæ and tarsi brown. Cerci depressed, acute. Supra-anal lamina transverse, rotundately bilobed. Subgenital lamina entire, margin arcuate, elongate.

Length of body (male)	... ..	20 mm.
Length of elytra	... ...	3·3 "
Length of pronotum	... ...	6·6 "
Width of pronotum	... ...	9·2 "

Habitat.—New Georgia" (Polynesia)?

This species apparently resembles my *Drymaplaneta submarginata* very much in coloring, but the genital appendages of the latter are almost quadrate, and not bilobed. There is, however, a single specimen in the collection S.A. Museum which has a bilobed supra-anal lamina, and may be referred to the above; the cerci are, however, much longer.

PLATYZOSTERIA BIFIDA, *Br.* (in litt. Sauss., Mel. Orth., II., 110, fig. 37.

"Blackish chestnut, depressed. Pronotum semiorbicular. Coxæ bordered dull reddish. Supra-anal lamina triangular, produced, elongate. Subgenital lamina elongate, quadrate, cordiformly incised.

Length of body (male)	... ...	30 mm.
Lenth of pronotum	... ...	7 "
Width of pronotum	... ...	11·2 "

Habitat.—Queensland."

PLATYZOSTERIA ZONATA, *Walker* (?).

A specimen of a female (larva) presented by C. French Esq.

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agrees so well with Walker's description (as far as it goes) that I have little doubt in referring it to this species, and from it the following fuller description is drawn up. Being, however, immature, it may really belong to the next species notwithstanding their widely distant habitat, &c.

Black. Head reddish brown. Antennæ brown, middle portion above third joint black. Pronotum smooth, shining, with a few distant impressed dots; margin all round pale yellow; disk black, oval. Meso- and meta-notum similar, the black discal spot *forming a narrow transverse segment of a circle*, convex behind. Legs reddish brown, coxæ bordered yellow and black. Abdomen very broad behind, scabrous, *concolorous*, hindangles produced acutely behind. Subgenital lamina prominent, subsemicircular, deeply carinate (not valvate).

Length of body (female)	...	...	15	mm.
Length of pronotum	...	...	4	"
Width of pronotum	...	...	6·5	"
Width of abdomen	...	...	9·5	"

Habitat—Queensland.

PLATYZOSTERIA SUBZONATA, *spec. nov.*

Brownish black, shining; male convex, female flat. Head and antennæ brown, ocelliform spots minute, foremargin of clypeus broadly testaceous. Pronotum elliptical, fore and lateral margins broadly yellow, hindmargin narrowly yellow (the pale band more or less imperfectly contiguous with the pale lateral border in the male and widely separated in the female), disk black, rounded in front, acute angular behind. Meso- and meta-notum with lateral and hindmargins similar, disc black, *angular*. Legs brown. Abdomen roughly impressed punctate, hindmargin of segments reddish brown, lateral margins with a yellow spot, reproduced much smaller beneath. Supra-anal lamina of male truncate; hindmargin entire, paler, densely ciliate; of female, rounded, black. Cerci of male subterete, black; apex acute, red; of female wholly red. Subgenital lamina of male transverse; hindmargin concave, angles forming short spines. Styles rather long red. Collection S.A. Museum.

		Male.	Female.
Length of body ...	...	18 mm.	22 mm.
Length of pronotum	...	4·5 "	6 "
Width of pronotum	...	8·3 "	10·5 "
Width of abdomen	...	9 "	14 "

Habitat—Victoria (presented by C. French, Esq., F.L.S.).

This species belongs to the same type as the preceding and *P. trifasciata*, Tepp., but differs from both not only in the color marks, but in various other more essential details.

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PLATYZOSTERIA (?) PICTA, *spec. nov.*

Reddish chestnut; oval. Margin of clypeus, and the antennæ beyond the first joint, yellow. Pronotum semicircular, angles obtuse, hindmargin slightly produced in the middle, finely impressed rugulose, with distant shallow pits and smooth spots of various forms; *laterally a broad intramarginal yellow band*, widely separate in front, *curved inward* behind but not attaining the hindmargin, and bordered exteriorly with brown, including the whole posterior angle. Meso- and metanotum similar, the broad oblique yellow bar terminating acutangularly inward; hindangles slightly and obtusely produced. Elytra absent. Legs and underside of body color, coxæ bordered yellow. Abdomen *rugulose*, with rows of coarsely-impressed pits, confluent on the posterior segments, each segment laterally with an *oblique*, *subtriangular* bar, bordered brown (reproduced beneath as a small spot), and a few brown dots. Supra-anal lamina rugulose, arcuate, rounded, margin slightly serrulate, a triangular yellow spot on each side near the base. Cerci brown, acute, not exceeding the lamina. Apex pale. Collection S.A. Museum.

	Fem. (mature).	Fem. (larva ?).
Length of body ...	... 25 mm.	23 mm.
Length of pronotum	... 7 "	6·5 "
Width of pronotum	... 12·5 "	11·5 "
Width of abdomen	... 16 "	13 "

Habitat.—Cooktown, North Queensland; Victoria (?) (presented by C. French, Esq., F.L.S.).

There are two specimens of females before me which agree in general aspect, but differ in some details, due probably to age. The pale band of the pronotum of the smaller one is contiguous in front, not widely separate, as in the other, and much more distant from the hindmargin; the bands of the meso- and metanotum, also of the abdomen, are very much smaller, the pale spots of the lamina wholly absent, and the cerci black.

Altogether the aspect and markings of this species are so different from its congeners that its place in this genus seems doubtful, and it might be assigned with almost equal reasons to *Anamesia*, *Polyzosteria*, or a separate subgenus, possessing intermediary affinities and differences. The present work is still of a preliminary character, and only when larger collections of species and individuals have been brought together and critically collated will any finality in arrangement be possible.

PLATYZOSTERIA EXASPERA, *spec. nov.*

Chestnut, shining. Head red, mouthparts blackish, ocelliform spots minute, antennæ brown, basal part black, except first segment. Pronotum semicircular, with a few impressed dots on the

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minutely shagreened surface; lateral margins narrowly reflexed, hindmargin slightly convex, finely subserrate, hindangles produced. Meso- and metanotum similar, impressed dots more numerous. Elytra lobiform, almost free, scabrous, exceeding the mesonotum. Tibiæ and tarsi partly or wholly black, coxæ black, bordered yellow; femora red. Abdomen nearly smooth, hindmargins of segments with minute distant, raised striæ; hindangles of segments three to six produced into successively larger, flat, acute spines; underside blackish, hindmargins of all segments scabrous. Supra-anal lamina of male subtransverse, narrower behind, rugulose, lateral margins reflexed, middle depressed; *angles acute, spinelike;* hindmargin ciliate, nearly straight. Cerci sublanceolate, ciliate, much shorter than lamina; black, apex red. Subgenital lamina of male transverse, subquadrate, laterally much incrassated; hindmargins subsinuous, angles produced as obtuse spines. Styles red, *inserted in an excavation of the lateral ridge* exterior to the terminal spines and *in a line with the hindmargin.* Collection S.A. Museum.

Length of body (male)...	18	mm.
Length of elytra	3	"
Length of pronotum	5	"
Width of pronotum	9·5	"

Habitat—Victoria (presented by C. French, Esq., F.L.S).

The species resembles *P. castanea, nova-zealandiæ,* and *pseudocastanea* in aspect, but differs in the colors of the tibiæ and tarsi, and especially in the structure of the supra-anal and subgenital lamina.

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LEPTOZOSTERIA SECUNDA, *spec. nov.*

Elongate oval, yellowish, translucent, very shining. Head and palpi pale, antennæ a little darker; face with a black longitudinal band. Pronotum broadly elliptical, angles rounded, fore- and hindmargin black; disk anteriorly with a black figure in the middle like the conventional flying birds in diagrams; a curved black oblique streak on each side, acute in front, broad in the middle, converging towards the middle of the hindmargin and rotundately joining that from the opposite side. Mesonotum with fore- and hindmargin black as far as the elytra, slightly raised, distant diverging ridges medially, and a small oval black dot on each side near the middle. *Elytra lobiform, free, acuminate,* apex black. Metanotum with foremargin black in the middle, hindmargin black throughout, in the disk a short black streak on each side; no raised ridges. *Wing lobes discernible,* not free. Legs, underside of thorax, and lateral margins of abdomen pale yellowish, spines of former and disk of latter varied brown

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to black. Abdomen finely impressed punctate, segments finely serrate, angles acute, *produced as a short, flat, trigonal spine posteriorly*, lateral margins yellowish, foremargins of first and second segment pale; hindmargins, except of last segment, black, widest in the middle; disk reddish chestnut. Supra-anal lamina arcuate, narrowly trigonal, pale, base black; hindmargin broadly and angularly emarginate, lobes acute, lateral margin dentate. Cerci lanceolate, acute, serrate, ciliate, pale, flat, more than twice exceeding the lamina. Valvules of female highly arcuate, black, apex pale, ciliate. Collection S.A. Museum.

Length of body (female)	...	...	24 mm.
Length of elytra	...	...	3·5 "
Length of pronotum	...	...	6 "
Width of pronotum	...	...	11·5 "

Habitat—Cooktown, Queensland (presented by C. French, Esq., F.L.S.).

The above description is drawn up from a specimen of a female, being the second species of this singular genus. It agrees with the other in general aspect and the curious translucency of the pale portions of the scutum, which permits the internal musculation, &c., to be seen even in dry specimens, but differs largely in markings and other details, as, for example, the presence of lobiform elytra.

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PERIPLANETA MARGINALIS, *Sauss.* (Mel. Orth., I., 81) = *P. ligata*, Br.

The synonymy is indicated by Saussure, and a variety recorded with two testaceous spots on the disc of the pronotum.

PERIPLANETA FLAVICINCTA, *Hagenbach*, *Bijdragen*, 1842; *Brunner*, Syst. Blatt., 231; *P. soror* (?), Sauss, Rev. Zool., 1864, 319, 24; Mel. Orth., I., 81.

"Chestnut, shining. Pronotum very smooth, oblong, semiorbicular; hindmargin straight, angles scarcely rounded, a yellow central spot and similar intramarginal streaks sharply defined and produced along the marginal area of the elytra. Elytra and wings shorter than the abdomen.

Length of body (male)	...	18	mm.
Length of elytra	...	10	"
Length of pronotum	...	7	"
Width of pronotum	...	8·5	" *(Brunner).*"

Habitat.—Java (*DeHaan*); New Holland (*Saussure*).

Brunner states that DeHaan's description, based upon one individual (Novara Museum), was very short, and that he supplemented the same (apparently from the same specimen).

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Saussure had previously described a similar species (1864) as *P. soror*, unknown to Brunner, from Australian specimens, and claims priority for his name on account of the insufficiency of the first description. On the absence of specimens from either locality, the point cannot be decided, but they may, after all, be separate.

Periplaneta Heydeniana, Sauss. = PLATYZOSTERIA HEYDENIANA.

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PERIPLANETA GLABRA, *Walker*.

A specimen of a female, collected, according to the label, in North Queensland, was among those presented by Mr. French, and identical with the Northern Territory specimens.

(Page 114.)

ARCHIBLATTA, *Snellen*. Tijdschr. Ent. Leyden, V., 106, pl. 6, fig. 12; *Brunner*, Syst. Blatt., 248.

Planetica, Sauss. (Mel. Orth., I., 38).

"Pronotum narrow, trapezoidal, foremargin emarginate, disk rugose, legs long, femora very slender, terete, unarmed. Males winged. Elytra much longer than the body, veins forked, scapulary vein much raised, and vein impressed. Veins of the wings much branched. Abdomen dilated, segment 7 covering the succeeding ones. Supra-anal lamina quadrate, angles obtuse, doubly exceeded by the cerci. Subgenital lamina produced, rotundate, with short styles.

Females apterous. Meso- and meta-notum much produced, hindmargins unequal. Abdomen thick. Supra-anal lamina triangular, produced, cerci shorter."

ARCHIBLATTA HOEVENI, *Snellen*. Br. Syst., 248, fig. 39.

Planetica aranea, Sauss., Melb. Orth., I., 38, fig. 23.

Brownish-black. Antennæ annulate. Pronotum rugose, margins all incrassated. Elytra of male with costal area deflexed at right-angles, anal area very long, axillary vein very forked. Meso- and metanotum of female rugose, produced behind. Legs very long, femora terete, tibiæ with a few small spinelets. Abdomen orbicular."

	Male.	Female.
Length of body	34 mm.	53 mm.
Length of elytra	42 "	—
Length of pronotum ...	10 "	14 "
Width of pronotum ...	11 "	13 "

Habitat.—Sumatra (*Snellen*); India (*Brunner*); N. Guinea (*Saussure*).

The above is an abstract of Brunner's description; that of

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Saussure is much shorter and less efficient, but his figure very good.

CHORISONEURIDÆ.

(Page 116.)

CHORISONEURA PECTINATA, *Sauss.*, Mel. Orth., II., 131.

Piceous, head reddish, vertex testaceous. Pronotum pellucid, with two brown stripes. Elytra pectinately veined, foremargin and suture pellucid, median band brown.

	Male.
Length of body ...	8·5 mm. (to end of elytra)
Length of elytra ...	7 "
Length of pronotum	1·4 "
Width of pronotum	2 "

Habitat.—New Holland" (Australia).

PANCHLORIDÆ.

(Page 118.)

ONISCOSOMA CASTANEA, *Brunner.*

Zetobora granicollis, Saussure, Mel. Orth., I., 33, fig. 21.

Through Messrs. C. French and F. J. Billinghurst I obtained 20 specimens of this species collected in Victoria, viz., six males, eight females, and six larvæ, and I find that in aspect they all differ sufficiently from the usual form, so that one may separate the two almost at a glance, while the differences in more essential characters (at least for me) are very slight. The Victorian form is much darker in color, viz., almost black, and the granules apparently much more numerous, conspicuous and darker, while the males are also narrower across the elytra, when at rest, notably beyond the middle, and the larvæ less conspicuously marked. I therefore suggest Saussure's trivial name to be retained as a varietal one for the Victorian form, viz., "*var. granicollis*, Sauss.," he most likely having obtained his specimens from the eastern part of Australia. Collection S.A. Museum.

A larva from Cooktown, Queensland, presented by C. French, probably belongs to another species, being very promiscuously colored. It has a very broad pale margin all round, a similar median stripe divided by a fine black line, a short, angular, pale transverse band on the second segment of the abdomen; and a pale patch from the sixth to the apex, remainder of disk blackish. All parts are covered with raised granules, which are black in the pale areas, and form transverse rows, notably along the hind-margins. The cerci are extremely short.

Length of body, 18 mm.; of pronotum, 4 mm.; and the width of the latter, 4 mm. Until mature specimens can be studied I cannot attach any name. Collection S.A. Museum.

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PERISPHAERIDÆ.

(Page 122.)

DEROCALYMMA CONTIGUA, *Sauss.* (Mel. Orth., II., 140, fig. 51).

"Chestnut. Eyes contiguous, antennæ reddish. Pronotum much arched, unequally punctate, foremargin broad, slightly arched, hooded, extending lobelike on both sides; hindmargin much arched, excised on both sides, inferior facial ridge ending in processes. Elytra chestnut, wings hyaline. Femora nearly unarmed. Abdomen broad, orange above, red beneath.

Length of body (male)	15	mm.
Length of elytra	15	"
Length of pronotum	5	"
Width of pronotum	6	"

Habitat.—New Guinea."

ECTATODERUS NOUMEENSIS, *Sauss.*

Genus and species belong to the GRYLLIDÆ.

PANESTHIDÆ.

DASYPOSOMA, *Brunner* (Syst. Blatt., 387, fig. 59.

"Pronotum semiorbicular, rather shining. Apterous. Legs very stout. Supra-anal lamina rotundate, subgenital lamina of the male and last ventral segment of female almost alike.

Cryptocercus, Scudder.

The genus as established by Brunner only embraced three American species, to which Saussure subsequently added the following, which may probably be referable to some other genus.

DASYPOSOMA CASTANEA, *Sauss.* (Mel. Orth., I., 105).

"Stout. Reddish chestnut. Head and legs orange testaceous.

Length of body (male)	32	mm.
Length of pronotum	10	"
Width of pronotum	15-5	"
Width of abdomen	19	"

Habitat.—'New Holland" (Australia).

Dasyposoma nigra, Br. (Syst. Blatt., 388, fig. 57. Brazil).

Brunner's figure resembles in outline, aspect of thoracic segments, and lamina my *Anamesia fulvornata;* but the angles of the abdominal segments are neither produced, nor angular, being rounded, while the surface sculpture differs widely. It may be, however, that the latter and Saussure's species form an allied genus or subgenus.

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(Page 124.)

PANESTHIA DILATATA, *Sauss.* (Rev. Zool., 346, 64 (male); Mel. Orth., I., 105).

"Sculpture of pronotum sometimes little apparent, V-shaped ridge strongly developed. The female (according to Brunner *in litteris*) with two stout, acute, perpendicularly erect spines on the sixth abdominal segment. (Dimensions not given.).

Habitat—New Holland" (Australia).

Panesthia regina, Sauss. (Mel. Orth., I., 39, 105, fig. 24).

Synonymous with P. MORIO, *Brunner.*

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Panesthia cribrata, Sauss.=P. JAVONICA, *Serv.*

"One of the numerous varieties."—*Saussure* (Mel. Orth., I., 106).

PANESTHIA KRAUSSIANA, *Sauss.* (Mel. Orth., II., 150).

"Chestnut, shining, wingless. Head concealed, band from the eyes to the clypeus yellow. Thorax on both sides with a broad orange band. Pronotum granulate, in front entire, reflexed. Abdomen near margin punctate, reddish. Supra-anal lamina subcrenulate in the middle. Tarsi yellow beneath.

Length of body (female) ...	... 32 –41	mm.
Length of pronotum ...	... 8·2–10	"
Width of pronotum ...	... 13·5–15·5	"
Width of abdomen ...	... 18 –20	"

Habitat—Melbourne" (Victoria).

PANESTHIA LAEVICOLLIS, *Sauss.* (Mel. Orth., II., 151).

Blackish chestnut. Pronotum shining, foremargin entire, disk angularly impressed. Elytra marginally punctate. Supra-anal lamina cranulate.

Length of body (female)	... 28	mm.
Length of pronotum	... 7	"
Width of pronotum	... 10·3	"
Width of abdomen	... 15	"

Habitat—New Holland" (Australia).

Among the specimens received from Mr. C. French is a male which may be mated with the above on account of the conformity of structure of the pronotum, color, size, &c.. I therefore add its description.

Male. Blackish chestnut, shining. Head prominent, concolorous; clypeus pale yellow; antennæ and palpi brown. Pronotum subhexagonal, entire in front and not reflexed; tubercle scarcely perceptible; anterior lateral margin broad

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much reflexed, punctate, brown; remainder of margin scarcely reflexed; hindmargin slightly convex; disk finely punctate v-shaped furrow rather deep, included space rugose. Elytra long, brown; base of scapulary and the anal vein pale, other veins deep brown; costal margin broad, punctate. Wings smoky, as long as the elytra. Posterior part of the coxæ, the knees and tarsi testaceous. Abdomen rugosely punctate, hindangles of segments acute, slightly produced; base underneath reddish. Supra-anal lamina transverse, hindmargin rounded, crenulate; first tooth on each side larger and longer. Cerci thick, scarcely prominent, ciliate, testaceous; apex oval. Subgenital lamina very broad, subsemicircular, very rugose; margin entire. Styles obsolete. Collection S.A. Museum.

Length of body (male)	28	mm.
Length of elytra	26·5	"
Length of pronotum	5·5	"
Width of pronotum	9·3	"
Width of abdomen	12·5	"

Habitat—Victoria.

PARANAUPHOETA, *Brunner*, Syst. Blatt., 397.

"Pronotum rotundate in front leaving the head free, truncate behind, disk depressed, flat. Elytra leaving scutellum free, narrowed in the middle; veins distinct, anal vein attaining the middle of the sutural margin. Wings membranous. Legs slender. Abdomen elongate. Supra-anal lamina rounded. Cerci short. Subgenital lamina of male semiorbicular. Styles present."

The five species of the genus belong to the Malayan Archipelago, but Saussure reports the following one from the Australian region :—

PARANAUPHOETA RUFIPES, *Brunner*, Syst. Blatt., 400; *Sauss.* (Mel. Orth., II., 154).

"Small, black. Head and antennæ dull black. Pronotum brownish black, bordered with yellow in front and laterally, and two trigonal spots adjoining the hindmargin. Elytra reddish chestnut, base and middle with a yellow spot, foremargin testaceous, discoidal vein with two apical branches. Legs red, base brown. Abdomen brownish testaceous, beneath brownish black. Cerci styliform.

Length of body (male)...	17	mm.
Length of elytra	15	"
Length of pronotum	3·8	"
Width of pronotum	6	"

Habitat—Ternate (*Brunner*); New Guinea" (*Saussure*).

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On a New Land Shell from Central Australia.

By W. T. Bednall.

[Read September 4, 1894.]

Hadra Adcockiana, *sp. nov.*

Shell deeply umbilicated, depressedly globose, thin, shining, surface finely and evenly striated. Whorls four and a-half, flatly but regularly convex; first and second very finely striated under the lens, striations becoming more pronounced with the revolution of the shell; last whorl three-fourths the size of the whole shell, descending slightly in front, constricted at the outer lip; base somewhat flattened; striations extending from the suture to the umbilical region, but becoming much less distinct after crossing the periphery. Suture impressed. Aperture oblique, sub-circular, peristome thickened; outer lip slightly expanded and reflected; columellar margin narrowly expanded, and but partially covering the umbilicus; margins approximating, and connected by a diffused gamboge-colored callus. Color, opaque-white, encircled by two well-defined narrow fuscous bands, one at the upper part of the whorl adjoining the suture, the other just above the periphery; both bands are clearly seen in the interior of the aperture.

Dimensions.—Major diameter, 14 mm.; minor, 12 mm.; altitude, 8 mm.; height of aperture, 7 mm.; length, 7·5 mm.; diameter of umbilicus, 2 mm.

This species appears to occupy an intermediate position between *Hadra Everardensis*, Bednall, of the Everard Range, and the more Southern representative of the genus, *Hadra Lorioliana*, Crosse, of the Flinders Range. It is less conical than the former, and not so depressed as the latter species.

All the specimens—three in number—are perfect, and evidently full-grown. They are in the collection of Mr. D. J. Adcock, and were obtained by Mr. Robert Thornton, of the Tempe Downs Station, early in 1893.

Relative dimensions of the species referred to :—

	Major diam.	Minor diam.	Altitude.	Height of Aperture.	Length of Aperture.	Diam. of Umbilicus.
Lorioliana ...	26	22	14	14	15	—
Adcockiana ...	14	12	8	7	7·5	2
Everardensis...	13	11·5	9·75	6·75	6·75	2·5

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Brief Diagnoses of Mollusca from Central Australia.

By Professor Ralph Tate.

[Read October 2, 1894.]

Succinea interioris, *sp. nov.*

Slender, aperture two-thirds the length of the shell, and thus near to *S. scalarina*; but is nearly twice the dimensions. The last whorl is not quite so convex, and the spire is shorter and narrower.

Length, 17; diameters, 9·25 and 6·5. Aperture: length, 11·5; width, 7 mm.

Stenogyra interioris, *sp. nov.*

Similar to *S. gracilis*, Hutton (*S. Tuckeri*, Pfr.), but is more slender, has nine whorls instead of eight in a length of 10·5 mm.; whorls less convex, but the suture more profund; the growth-lines finer, more regular, and closer together.

Length, 10·5; width, about 2·25 mm.

Pupa ficulnea, *sp. nov.*

Similar to *P. australis*, but dextral and smaller; suture more channelled.

Length, 3·5; width, 1·75 (vix).

Pupa Beltiana, *sp. nov.*

A longer and narrower shell than *P. pacifica*, with less convex whorls, rarely sinistral.

Length, 4·5; width, 2·0 (vix); a more slender form 4·5 x 1·5.

Pupa ischna, *sp. nov.*

Sinistral, similar to *P. myoporinæ*, Tate, but more slender, with flatter whorls; more attenuate apically than *P. Beltiana*.

Length, 4·25; width, 1·25 mm.

Pupa eremicola, *sp. nov.*

Like *P. myoporinæ*, but much broader, less attenuate apically; aperture more oblique, peristome largely reflected. Differs from *P. Beltiana* by larger size, less convex whorls, and large umbilicus.

Length, 5·5; width, 2·5 mm.

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LIPARUS SPENCERI, *sp. nov.*

Similar to the short and broad variety of *L. melo*, but the test is thin, diaphanous, and dark horn-colored; the whorls are more convex and abruptly arched at the suture, the aperture slightly oblique and proportionately wider (as in *L. Onslowi*).

Length, 20; width, 12·5; aperture, 11·5 x 8 mm.

PLANISPIRA HEMICLAUSA, *sp. nov.*

Shell depressed, glossy; spire slightly prominent; whorls three and a-half, somewhat gradated, distantly and regularly sculptured with spiral incised lines, finely transversely striate; aperture not deflected, peristome much thickened, continuous all round, the parietal incrassation obliquely in advance and forming a vertical plate half-closing the aperture; umbilicus about one-third the width of the shell.

Diameter, 1·5; height, about ·5 mm.

CHAROPA ÆMULA, *sp. nov.*

Similar to *C. antialba*, Beddome, with the same number of riblets, but apparently inornate in the interstices; spire slightly sunken; umbilicus very much smaller, with regularly sloping walls.

Diameter, 2; height, ·75 (vix).

CHAROPA RETINODES, *sp. nov.*

Like *C. Mortii*, Cox, but the riblets more frequent, though wide apart, the interspaces regularly reticulate-striate; last whorl feebly flame-painted, and more depressed; umbilicus larger; the young shells not at all angulate.

HADRA WATTII, *sp. nov.*

Its only ally is *H. leucocheila*, from the unicolorous variety of which it differs, particularly, by more numerous very narrow whorls (six and a-half), smaller size, and very small umbilicus, not at all concealed by the columella.

Diameters, 10·5 and 9·25; height, 5·5.

HADRA SUBLEVATA, *sp. nov.*

Has the general appearance of *H. Eyrei*, but with five narrower whorls of less rapid increase, and scabrous-granulate surface; lips callously united, outer lip largely reflected, deeply constricted basally, producing a conspicuous elevated ridge within the aperture (thus resembling *H. Wesselensis*); umbilicus large, 2·5 mm. wide.

Diameters, 15 and 14; height, 8.

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HADRA SQUAMULOSA, *sp. nov.*

Very much like *H. Evandaleana* and *H. Victoriæ*, with the periphery rounded; last whorl slightly descending at the front, outer lip slightly reflected; surface densely covered with hispid scales, arising from elongate granular-like bosses.

Diameters, 15 and 12·5; height, 9·5; umbilicus, 3 mm. wide.

HADRA GRANDITUBERCULATA, *sp. nov.*

Globosely conical, slightly flatted at the suture, plicately striated with close, large, scabrous tubercles, a color-band at the suture, a broader one at the periphery, and a still broader one beneath; peristome entire, slightly reflected all round, obliquely subrotund; umbilicus wide and deep.

Diameters, 17 and 14; height, 13; longer diameter of aperture, 10 mm.

HADRA CLYDONIGERA, *sp. nov.*

Similar to *H. Silveri*, but without the angulation at the suture and periphery; costæ more compressed and uninterrupted; last whorl more descending at the front; outer lip more abruptly reflected.

Diameters, 16 and 14; height, 11·5 mm.

HADRA ARCIGERENS, *sp. nov.*

Has the general aspect of *H. Bordaensis*, but flatter, and less angulated; ornamented with elevated, compressed, arched ribs (about 40 on body whorl), the interspaces densely granulated; there are three faint color-bands on body-whorl; peristome slightly deflected posteriorly, entire, slightly reflected all round.

Diameters, 18 and 15; height, 8; width of umbilicus, 4.

HADRA WILPENENSIS, *sp. nov.*

Has the external features of *H. fodinalis*, except the ornament, which is that of *H. crytopleura*; plicæ rather stout and elevated, about 70 on body-whorl, interspaces apparently without granules.

Diameters, 16 and 14; height, 12·5.

Collected by the late Mr. Tomsett at Blackfellow's Creek, six miles east of Wilpena Pound.

HADRA OLIGOPLEURA, *sp. nov.*

Similar to *H. crytopleura*, but the plications sharper, higher, and about one-third less in number (35 to 40); the outer lip is thin, and the whorl is more constricted behind it.

Diameters, 14·5 and 12; height, 8; height of aperture, 6 mm.

Eyre's Sand-Patch, 160 miles west from Eucla, W.A. (Received through Mr. Adcock.)

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HADRA SETIGERA, *sp. nov.*

Similar to *H. cyrtopleura*, but with slender, crowded, arched growth-lines, and covered by a thin brown periostracum, which is raised into short bristles coincident with the arched ridges; whorls more convex, and suture more impressed.

Diameters, 13·5 and 11; height, 6; diameters of umbilicus 5 and 4·5 mm.

HADRA EUZYGA, *sp nov.*

Similar to *H. setigera*, but the spire is flattened, the last whorl more depressed, and the rows of bristles more distant; also like *H. cyclostomata*, but the spire is flat and the aperture more descending and entire.

Diameters, 8 and 7; height, 3 mm.

HADRA WINNECKEANA, *sp. nov.*

Similar to *H. euzyga*, but apparently without bristles, the arched growth-lines close and exceedingly fine.

Diameters, 5 and 4·5; height, 2 mm.

HADRA PAPILLOSA, *sp. nov.*

Differs from other members of the "Angasella group" by its elevated spire; surface with coarse and somewhat interrupted arched plicæ, which bear distant large depressed papillæ; last whorl much descending, peristome largely reflected and entire; umbilicus one-third the width of the base.

Diameters, 13·5 and 11; height, 8·5 mm.

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Notes on the Organic Remains of the Osseous Clays at Lake Callabonna.

By Professor Ralph Tate.

[Read September 5, 1893.]

The stratum in which the diprotodon and associated vertebrate fossils are found is a blue tenacious clay, though containing about 12 per cent. of sharp quartz-sand, as determined by mechanical separation. Overlying the blue clay is a sand, which constitutes a fringe to the lacustrine plain, and appears as islets dotting its surface. Lake Callabonna is now a salt-pan, but is occasionally submerged, either as the result of heavy local rains or by the superfluous water of Cooper Creek, reaching it by way of Strzelecki Creek and Lake Blanche.

Anxious to learn something of the physical conditions which prevailed at the time when the diprotodons inhabited this area, I have minutely searched the clay and sand, obligingly placed at my disposal by Dr. Stirling and Mr. Zeitz, for their organic contents, with the following results :—

The clay has yielded two cones of the smooth-valved form of *Callitris robusta*, R. Brown, the living sandarach-pine, so widely distributed in Australia, and certainly an inhabitant of its "dry zone;" oospores of characeous plants, probably of two species, one of which I refer with a doubt to *Chara Braunii;* fragments of a small gastropodous shell, probably of the genus *Potamopry-gus*. The charas and the mollusc are aquatic in habit, and may have endured a brackish water medium. The sand has furnished a new species of *Blanfordia*, *B. Stirlingi*, *Melania lutosa*, *Corbicula desolata*, which occurs in a living state in Cooper Creek, a cypris-like ostracod, and the charas above-mentioned. The Blanfordia is related to *B. striatula*, an inhabitant of brackish waterpools on the coastal tracts of Southern Australia; but this alliance does not forbid a strictly fresh-water habit, which is implied by the association with *Corbicula* and *Melania*, though it may indicate an increased salinity of the lake-waters prior to their final dessication. Indeed, it is not at all improbable that all lived in the lake while its waters were fresh, that the *Corbicula* and *Melania* succumbed when the water became brackish, and that the *Blanfordia* was unaffected by the change, but became extinct through failure of the essential medium. The sand contains also small cylindrical tubes, about one millimetre diameter, which recall agglutinated-sand cases such as are constructed by some may-

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flies. However, they are freely soluble with effervesence in acid, and are, therefore, probably the calcified shapes of rootlets, which from their small and uniform size may have belonged to a cyperaceous or graminaceous plant.

BLANDFORDIA STIRLINGI, *spec. nov.*

Shell thin, subpellucid, of a pale flesh color, oval in outline, spire conical, apex obtuse or subacute, and slightly mammillated; whorls six, rather rapidly increasing in size, moderately convex, but more rapidly declinous posteriorly, ornamented with slightly arched striæ of growth, and in a spiral direction by a few threads. Aperture slightly oblique, inclining towards the columella; peritreme entire; columella effusively dilated over the umbilicus and basally. Umbilical fissure narrow, concealed by the columellar dilatation; young shells imperforate. Operculum pellucid, its exterior face deeply concave; nucleus subcentral, growth-lines slender, rather numerous, not coarse, few, and elevated as in *B. striatula.*

Length, 6·5; width, 4·75; height of aperture, 3 mm.

The short spire, more rapidly increasing whorls, not closely spirally lined, the more oblique aperture, and effuse inner lip distinguish this species from *B. striatula.* *B. Stirlingi* has not a decollated spire, as is usual with its congener, but when the apical whorls are present in the latter they are of more regular increase.

I do not know if *B. Stirlingi* be actually living, though it may possibly be so, as though all of the very numerous examples under observation, excepting one, are bleached and very fragile; yet the unique exception shows slight coloration, the test being unaltered, and it contained an operculum.

I bestow on this modest shell the name of my colleague, who has so largely promoted the exploitation of the extinct vertebrates in the region of its occurrence.

Var. MAMMILLATA.

Similar to *B. Stirlingi*, but short and squat, somewhat resembling a *Bithynia.* Whorls five and a-half, the antepenultimate or penultimate suddenly increasing in size, and flatted at the suture, so that the posterior part of the spire appears mammillated.

Dimensions.—Length, 5·25; breadth, 3·5; height of aperture, 2·75 mm.

Locality.—On the shore of a dry salt lake near Nannine, Murchison Goldfield, W.A., in great abundance *(Mr. Victor Streich).* A few examples at Lake Callabonna.

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Notes on the Sedimentary Rocks in the MacDonnell and James Ranges.

By Charles Chewings, Ph. D., F.G.S.

[Read June 5, 1894.]

The object of the present paper is to point out, what I believe to be, an error the Government Geologist, Mr. H. Y. L. Brown, has made in the reading of the Sedimentary Rocks composing the MacDonnell and the James Ranges; the area lying principally within the watershed of the Finke River and its tributaries. I refer to Mr. Brown's report to the Commissioner of Crown Lands, 1892, and entitled "Further Geological Examination of Leigh's Creek and Hergott Districts, &c." (Page 7, with ideal section).

The stratigraphy of the MacDonnell and Ranges lying to the south has already received some attention, but its importance has not been so generally realised as perhaps it warrants. The time has arrived for definitely fixing on the most typical areas of exposures and development for purposes of reference; and I will endeavor to indicate the best as known to me, and then state very briefly where I believe Mr. Brown is in error.

Foundation Rocks (Archæan of Brown).

The most typical area is the north side of the MacDonnell Range. These rocks are composed of gneisses, various schists, dynamometamorphic granite, crystalline limestone, &c.; generally disposed at steep angles, and over large areas are quite vertical. Into this series granite and diorite, &c., have been intruded. Strike east and west.

Glen Helen Series (Cambrian and Pre-Cambrian [?]).

The valley in which Glen Helen Station stands is a good typical area; it is situated in the MacDonnell Ranges, at the head of the Finke River. The principal rocks are quartzite, blue crystalline limestones, dolomite, and clay, slate, &c., usually with a dip of 70° to 90°. Quartzite is the lowest stratum, and rests unconformably on the "Foundation Rocks." These are found largely developed in the so-called South MacDonnells, and in other ranges, and they rise through the eroded Lower Silurian anticlinals in several places, *e.g.*, on the Petermann Creek. These rocks are generally seen to be nearly or quite vertically disposed, but are not always so. Strike generally east and west. In the quartzites on the north side of Mareeno Bluff

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Pass annelide burrows are numerous. These rocks may be Cambrian, and if so, these are the only traces of organic remains yet discovered in this series.

Mareeno Bluff Series (Lower Silurian in part).

A good typical section and area occurs at Mareeno Bluff, in the western part of the South MacDonnells, but these rocks have a large development in the James', Gardiner's, Geo. Gill's, Levi's, and other Ranges, and good typical areas exist at the heads of the Walker and Petermann Creeks and elsewhere. This series is composed from below upwards of red shale, then black and green shale, with fossiliferous bands of limestone, which, according to Etheridge, are of Lower Silurian age. This is conformably followed by a great development of red and white sandstones, with quartzite bands in places. The limestones and shales vary in thickness in different localities. This is, perhaps, the most important and widespread series of Palæozoic rocks in Central Australia. At Mount Palmer, in the Western MacDonnell, and on many of the eroded Silurian anticlinals, the unconformability of this series to the "Glen Helen Series" is apparent, and generally very marked. The strike is generally east and west, and the dip varies from 0° to 90°.

Walker's Creek Series (Devonian [?]).

This series of rocks has excellent typical sections at several places along the course of the Walker Creek, west of the Tempe Downs Station, in the James Ranges. The formation is generally confined, as it is at this place, within the synclinal folds of the Silurian Rocks (Mareeno Bluff Series), and would have long since been eroded quite away in many places but for the protection the Silurian and Cambrian trough edges have afforded; as it is, these rocks have been worn back for long distances from the older rocks. This Walker's Creek Series is composed of red mudstone and red and green shales, conformably overlaid by ferruginous sandstone, each being several hundreds of feet thick. The unconformability of this series to the Mareeno Bluff Series is very marked, as may be seen in many places along the Walker, as stated above. These rocks are sometimes seen in isolated patches resting unconformably on the highly or vertically inclined ridges of the Silurian and Cambrian Series.

Conclusions.

I agree with Mr. Brown in the what he terms the Archæan Rocks, they are the foundation rocks of Central Australia; but instead of three series of Palæozoic Rocks, he only admits two. He includes part of, if not the whole of, the Mareeno Bluff

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(Lower Silurian) Series in the Cambrian division, viz., in the Finke Gorge set of rocks, commonly called the South MacDonnells. If I am not mistaken, some part of the Walker's Creek Series (Devonian ?) may be found there in places as well. He fails to detect any unconformability between the Walker's Creek Series and the Mareeno Bluff Series. He does not discriminate the one from the other, and, what is more serious, states that the fossils of Lower Silurian age that have been found in the district at such places as Mareeno Bluff, heads of the Walker and Palmer Creeks, Levi's Range, and elsewhere have been found in the Upper Series. As a fact, they have only been found in the Middle or Mareeno Bluff Series. No fossils have as yet been found in the Upper or Walker's Creek Series.

In the paragraph "Lower Silurian Rocks" the description and dip of the rocks occurring at the Lutheran Mission Station are correct, but to class them as part and parcel of the Lower Silurian Rocks is quite wrong. They belong to the Upper or Walker's Creek Series, and not to the fossiliferous Lower Silurian Series, on which they rest unconformably. By failing to recognise this fact the paragraph is quite misleading. To discuss the errors Mr. Brown's reading would lead to in interpreting such Ranges as the James', Gardiner's, Geo. Gill's, and Levi's is needless. Suffice it to say that the Upper or Walker's Creek Series extends from north of the Mission Station, southwards (with one interruption) to near Parkes's Running Water, and east and west of that line for many miles; but south of the latter point Silurian and Cambrian rocks are more generally met with.

Mr. Brown is in error in stating that the upper series forms the George Gill's Range. That range is composed of Silurian Rocks in the main, but at the western end the Walker's Creek Series are seen to overlie the Silurian Rocks unconformably. I make this latter statement with hesitation, because I had not time to verify my impressions as to the Devonian being there, but think I may without much risk venture so far. The southern portion of the James' Ranges is composed chiefly of Silurian and Cambrian, not of the Walker's Creek Series of rocks. Until Ooraminna Cliff is proven to belong to the Walker's Creek Series it is better, in my opinion, not to connect the Walker's Creek (Devonian ?) Series and the Ooraminna Cliff Rocks together, because the Ooraminna Sandstone may turn out to be Silurian, and not, as has been supposed, of Devonian (?) age. There is a resemblance in the lithological character and in the bold headlands, which is a characteristic of both the Upper or Walker's Creek Series (Devonian ?) and the Lower Silurian or Mareeno Bluff Series, and I have no doubt it was this striking similarity that led Mr. Brown into error.

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Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October, 2, 1894.]

XVI.

CARABIDÆ.

LITHOSTROTUS (gen. nov. *Lebiidarum*).

Mas. Corpus pilis erectis vestitum; caput minus elongatum; oculi parvi (orbitu postoculari sat dilatato fere ultra oculum exstanti); palporum labialium articulus ultimus fortiter securiformis; mentum medium haud dentatum; antennarum articulus 3^us^ glabrer; prothoracis margo posticus fortiter lobatus; elytra postice oblique subtruncata; tarsi supra glabri, articulo 4° breviter emarginato; unguiculi basin versus serrati; tarsorum anticorum articuli 3 subtus squamulati.

The small *Lebiid* for which I propose this generic name is not much like any other known to me, and I hardly know where to place it in the sub-family; perhaps its structural characters point to an alliance with *Diabaticus*.

L. cœrulescens, sp. nov. Modice elongatus, capite quam prothorax vix angustiori; sat nitidus; nigro-cœruleus, antennis rufopiceis, tibiis rufis; supra pilis erectis minus crebre vestitus; antennis sat robustis prothoracis basin vix superantibus; capite prothoracèque fortius minus crebre punctulatis; hoc leviter transverso, canaliculato, anguste marginato, cordato, antice subtruncato, angulis posticis acutis dentiformibus; elytris subovatis minus convexis, fortiter striatis, interstitiis grosse seriatim punctulatis (sicut interstitia in tubercula planata divisa videntur). Long., 2 l.; lat., $\frac{4}{5}$ l.

The very peculiar sculpture of the elytra renders this species easily recognisable. The seriate punctures in the interstices are so coarse as to equal the width of the interstices themselves, which are thus interrupted at short intervals, so as to present the appearance of the surface of the elytra being tessellated by almost similar longitudinal and transverse striæ; or the appearance might be described as that of the interstices consisting of series of small square flat tubercles.

Victoria; Alpine District.

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ECTROMA.

E. parvicolle, sp. nov. Oblongum, postice paullo latius; testaceum elytris postice et segmento ventrali apicali infuscatis, prothorace obscure fusco-cincto et in medio fusco-bivittato; antennarum articulo basali 3° subbreviori; prothorace parvo sat transverso, antice subtruncato quam postice vix angustiori, lateribus parum arcuatis postice nullo modo sinuatis, angulis posticis sat rotundatis; elytris striatis. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{5}$ l.

As both the specimens that I have seen of this insect are females, there is a *possibility* that the discovery of the male might involve its removal from *Ectroma*, although it appears so evidently congeneric with the females of the species previously attributed to the genus that I do not think there is any danger in placing it with them. It is not unlike, in color and markings, *E. obsoletum*, Blackb., and has somewhat the appearance of a washed-out specimen of *Sarothrocrepis corticalis*, Fab. It may at once be distinguished, however, from *E. obsoletum*, and from the others previously described of the genus by its comparatively small prothorax, the sides of which are not at all sinuate behind, while the hind angles are extremely obtuse—almost rounded off.

W. Australia; sent by Mr. French.

AGONOCHEILA.

A. perplexa, sp. nov. Ferruginea, capite prothoraceque rufescentibus, elytrorum sutura et vitta submarginali (hac postice dilatata) infuscatis; prothorace fortiter transverso, antice parum emarginato, angulis anticis rotundatis posticis obtusis, lateribus sat fortiter arcuatis mox ante medium subangulatis postice vix sinuatis; elytris fortiter crebre (fere ut *A. cribripennis*, Chaud., sed paulo magis crebre) punctulatis, distincte striatis; maris tarsorum anticorum articulis modice dilatatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{10}$ l.

This species is easily recognisable by the puncturation of the elytra being as strong and coarse as, but evidently closer than, in *A cribripennis*, Chaud., while its elytra are about as distinctly striate as those of *A. curtula*, Er., and its prothorax scarcely differs from that of the latter species except in being slightly less transverse, and with hind angles slightly less defined.

Victoria.

SCOPODES.

S. simplex, sp. nov. Ovalis; nigro-cœruleus; capite supra longitudinaliter sat fortiter striolato; prothorace quam caput angustiori, supra leviter striolato, modice transverso, angulis posticis obtusis bene determinatis, latitudine majori mox pone marginem anticum posita, lateribus postice sinuatis

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antice subangulatis; elytris minus sericeis, striatis, interstitiis convexis (3° 3-punctato). Long. $2\frac{1}{2}$ l.; lat., 1 l. (vix).

Easily distinguishable by its uniform dark-blue color and by the absence of the appearance of silky tessellation on the elytra. These characters give it somewhat the general aspect of a *Catascopus*, but it seems to be a true *Scopodes*. The shape of the prothorax is more like that of *tasmanicus* than of any other species known to me, but the segment is less transverse than in *tasmanicus*, and is considerably more narrowed behind, with more explanate hind angles.

Victoria; on the higher mountains of the Alpine Range.

S. intermedius, sp. nov. Ovalis vel leviter ovatus; nigro-sericeus, elytris tessellatis, pedibus antennarumque basi luridis, illis plus minusve fulvo-variegatis; capite supra longitudinaliter sat fortiter striolato; prothorace quam caput angustiori, supra crebre sat distincte nec ordinatim striolato, modice transverso, angulis posticis sat fortiter dentiformibus, latitudine majori mox pone marginem anticum posita, lateribus ante medium fortiter angulatis (angulis subdentiformibus); elytris striatis interstitiis convexis sinuato-subinterruptis (3° 3-foveolato). Long., 2—$2\frac{2}{5}$ l.; lat., $\frac{9}{10}$—1 l.

This species has much the appearance of *S. sigillatus*, Germ., from which it differs chiefly by its considerably larger size and darker color, and by the much greater convexity of its elytral interstices (including the suture).

Tasmania; sent to me by A. Simson, Esq.

S. flavipes, sp. nov. Ovalis; sat nitidus; æneo-subauratus, sericeus, elytris plus minusve tessellatis, antennis pedibusque (tarsis vix infuscatis) flavo-testaceis; capite supra longitudinaliter striolato; prothorace quam caput angustiori, supra crebre subtiliter nec ordinatim striolato, modice transverso, angulis posticis sat fortiter dentiformibus, latitudine majori mox pone marginem anticum posita, lateribus ante medium fortiter angulatis (angulis subdentiformibus); elytris striatis, apice suturali subproducto, interstitiis vix convexis (3° 3-foveolato). Long., 2 l.; lat., $\frac{7}{10}$ l.

This species is another ally of *sigillatus*, compared with which it is a little larger, and more nitid, with a more golden tone of color; with legs and antennæ entirely yellow except a slight infuscation of the tarsi. The prothorax resembles that of *sigillatus*, except in the base being differently shaped; in *sigillatus* the hinder edge of the projecting hind angle runs *obliquely* hindward and inward so that the outline of that part of the prothoracic margin which is in front of the projecting hind angle is continued almost in the same direction for a short distance

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behind the hind angle, while in the present species the hind margin of the hind angle runs directly inward almost at right angles to the general lateral outline of the prothorax. The elytra are very like those of *sigillatus*, but with the interstices scarcely so convex, and the sutural apex evidently more produced.

S. Australia.

CYCLOTHORAX.

C. cinctipennis, Blackb. This species seems to be identical with that described by Castelnau under the name *Phorticosomus lateralis*, and must, therefore, stand as *Cyclothorax lateralis*, Cast. It has nothing to do with *Phorticosomus*.

HYDROPHILIDÆ.

PARACYMUS.

P. (*Cyclonotum*) *pygmæus*, Macl. I have recently received examples (compared with the type) of this insect from Mr. Lea. They seem certainly identical with *Paracymus* (*Hydrobius*) *nitidiusculus*, Brown. Macleay's is the older name.

STAPHYLINIDÆ.

PHILONTHUS.

P. sanguinicollis, Fauv. This species (from comparison with a type of Macleay's species sent to me by Mr. Lea) is identical with *Philonthus subcingulatus*, Macl., and must, therefore, become a synonym as Macleay's is the older name.

SCOPÆUS.

S. ruficollis, Fvl. This insect is probably, judging by Fauvel's description, identical with that described by Macleay as *Stilicus ovicollis*. I have recently obtained from Mr. Lea an example of the latter that has been compared with Macleay's type, and it is certainly a *Scopæus*. Macleay's is the older name.

NITIDULIDÆ.

BRACHYPEPLUS.

B. Haagi, Reitter, seems to be identical with *B. Murrayi*, Macl., of which Mr. Lea has sent me an example compared with the type. Reitter's description is too brief for absolutely certain identification, but the specimen of *B. Murrayi* agrees well with it as far as it goes. Both are founded on examples from Queensland. Macleay's is the older name.

CARPOPHILUS.

C. excellens, Reitter, is probably identical with *C. luridipennis*, Macl., of which Mr. Lea has sent me an example compared with the type. Macleay's is the older name.

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MACROURA.

M. Baileyi, Blackb. This species seems to be indentical with *M.* (*Carpophilus*) *obscurus*, Macl., of which Mr. Lea has sent me an example compared with the type. Macleay's is the older name.

MYCETOPHAGIDÆ.

DIPLOCŒLUS.

D. Leai, sp. nov. Sat late ovalis; brunneus, pilis elongatis concoloribus erectis vestitus; capite cum prothorace sparsim sat fortiter punctulato; hoc quam longiori fere duplo latiori, utrinque profunde longitudinaliter bisulcato (sulco interno basin versus late dilatato), in medio canaliculato (canali basin versus dilatato), antice et postice bisinuato, ad basin inæqualiter marginato, angulis posticis sat acutis; elytris vix manifeste striatis, longitudinaliter seriatim punctulatis, puncturis in seriebus alternis his majoribus illis minoribus; segmento basali ventrali in medio oblique bistriato; antennarum clavæ articulo 1° quam 2^us^ vix angustiori. Long., 3½ l.; lat., 1½ l.

Very distinct by its large size and the long erect pilosity with which it is clothed, the very strongly impressed sulci of its upper surface, &c.

N.S. Wales; taken by Mr. Lea.

LAMELLICORNES.

TEMNOPLECTRON.

T. diversicolle, sp. nov. Rotundato-ovatum; convexum; nigrum, obscure viridi-micans, pedibus rufescentibus, antennis palpisque testaceis; capite sat æquali vix planato vix manifeste punctulato, margine antico in medio bidentato; prothorace sublævi, quam longiori fere duplo latiori, sat convexo; lateribus antice subito oblique convergentibus pone medium vix manifeste marginatis, angulis anticis acutis (posticis rotundatis); elytris convexis lævibus, obsoletissime 7-striatis et striis distinctis nonnullis (his postice abbreviatis) in parte laterali quasi-epipleurali. Long., 3⅕ l.; lat., 2½ l.

This species is at once distinguished from the three known to me of those previously described as occurring in Queensland by the absence of a continuous reflexed margin to the prothorax. An extremely fine carinated edge is barely traceable for a short distance from the base, and is followed by an interval in which the prothorax has no trace whatever of a reflexed margin. The fourth Queensland species (*T. politulum*, Macl.) I have not seen, and its author has not characterised the structure of its prothoracic

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margin; but it is evidently distinct from the present insect, as its size is given as much smaller (long., 2¼ l.), and its head is said to have a "small sharp notch on either side under the eyes," which is not present in the specimen before me. Besides the Queensland species three from Western Australia have been described by Sir W. Macleay as attributable to this genus; they, however, are very different from the Queensland species, and perhaps not genuine members of *Temnoplectron*, as two of them are said to have the clypeus "sex-dentate in front;" and the other (scarcely described) is a very minute species (long., 1 l.). The examples on which this description is founded are females. Probably the sexual characters of the male are very similar to those in the other species of the genus.

N. Queensland.

RHOPÆA.

R. callabonnensis, sp. nov. Sat elongata; pubescens, capite inter oculos prothorace sternis (his densissime) pygidio pedibusque longe villosis; rufescens vel flavo-brunneus; clypeo (hoc fortiter concavo) et capite postice sublævibus; capite inter oculos crassissime ruguloso; prothorace quam longiori (et postice quam antice) duabus partibus latiori, minus crebre subfortiter punctulato, lateribus crenulatis angulis posticis obtusis; elytris subcrasse rugulosis, obsolete 4-costatis.

Maris antennarum flabello elongato 7-articulato. Long., 11 l.; lat., 5¼ l.

Differs from all its previously described congeners except *R. Mussoni*, Blackb., by its much coarser sculpture. From *Mussoni* it may be at once distinguished by the antennal flabellum of the male having seven equal joints, by the deeply concave and almost impunctulate clypeus, &c.

S. Australia; taken by Mr. Zietz near Lake Callabonna.

ZIETZIA (gen. nov. *Macrophyllidarum*).

Mas. Mentum sat planum, antice sat truncatum; maxillæ modicæ, loba externa dentata; palpi labiales breves, articulo apicali ad apicem obtuso; palpi maxillares elongati, articulo apicali quam ceteri conjuncti sublongiori supra longitudinaliter impresso; labrum perpendiculare haud emarginatum; antennæ 10-articulatæ, clava 8-articulata arcuata quam stipes quintuplo longiori; elytra (vix seriatim) punctulata, vix distincte costulata; coxæ anticæ transversæ; pedes modici, tarsis haud dilatatis, unguiculis simplicibus.

This genus may be at once distinguished from nearly if not quite all other *Melelonthid* genera by the following characters in combination:—Claws simple, antennæ 10-jointed, with an 8-jointed club. It is no doubt allied to *Holophylla* and *Othnonius*.

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Z. geologa, sp. nov. Oblonga; sat parallela; vix nitida; testaceo-brunnea; clypeo subverticali profunde concavo; capite inter oculos grosse ruguloso et breviter hirsuto postice in medio lævi; prothorace fortiter transverso sat grosse sat crebre punctulato, lateribus fortiter rotundatis, angulis anticis obtusis minus productis posticis subrectis; scutello fere ut prothorax, elytris magis grosse magis rugulose, punctulatis; pygidio minus verticali, sat gibboso, sat obscure punctulato; corpore supra setis pallidis brevibus (his singulis in puncturis singulis positis) vestito; corpore subtus antice longe postice minus perspicue hirsuto. Long., 8 l.; lat., 4 l. (vix).

This species is evidently much like *Holophylla furfuracea*, Burm., in general appearance; but as its antennæ, claws, and abdomen all differ in most important characters from those of *H. furfuracea* as Burmeister describes them, it can have nothing to do with that genus. As I have previously pointed out to the Roy. Soc. S.A. (Tr., 1867, p. 211), Burmeister and Erichson differ *inter se re* the abdominal character of *Holophylla*, which cannot be a member (if the former is reliable) of the *Macrophyllides*. Indeed, he distinctly says it is not. If he is wrong, and if moreover the antennal discrepancies were disregarded, on the supposition that both authors might have mistaken a female for a male, there would still remain the fact that both authors describe the claws as dentate, and that is a discrepancy which cannot be evaded.

S. Australia; taken by Mr. Zeitz near Lake Callabonna.

ANOPLOGNATHUS.

A. quadrilineatus, Waterh. This species is clearly identical with *A. abnormis*, Macl. Macleay's is the older name.

CORYNOPHYLLUS.

C. melas, Fairm. This species seems from the description quite indistinguishable from *C. Haroldi*, Shp., and is doubtless identical with it. Dr. Sharp's is the older name.

ISODON.

I. (Cheiroplatys) pecuarius, Reiche. This insect is certainly, I think, an *Isodon*. *I. subcornutus*, Fairm., is almost certainly identical with it. Reiche's is the older name.

MICROVALGUS.

M. scutellaris, sp. nov. Nigro-piceus, squamis albis (nonnullis piceis intermixtis) vestitus, antennis palpis prothorace (maculis nonnullis exceptis) elytrisque ferrugineis; prothorace quam longiori vix latiori, obscure squamose punctulato, antice sat angustato, angulis anticis acutis sat fortiter

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productis posticis obtusis; elytris vix perspicue punctulato-striatis. Long., 1⅘—2⅕ l.; lat., $\frac{9}{10}$—1 l.

This species is much like *M. Lapeyrousei*, L & G., but differs from it by larger size, dark-piceous color of scutellum, and mixture among the whitish scales of the upper surface of an almost equal proportion of *dark* scales.

N.S. Wales.

BUPRESTIDÆ.

CYPHOGASTRA.

C. Macfarlanei, Waterh. Mr. French has lately received a specimen taken in the Endeavour River District of N. Queensland apparently referable to this species (which was founded on an example from Murray Island in Torres Straits). Mr. Waterhouse's description consists merely of a few lines briefly indicating the differences between *C. Macfarlanei* and *C. venerea*, Thoms., so it is difficult to feel quite sure in identifying his insect, but certainly the differences between the specimen from N. Queensland before me and *C. venerea* seem to be almost exactly those Mr. Waterhouse specifies. The only discrepancy I observe is that whereas Mr. Waterhouse says *Macfarlanei* has "indications of a small impression below the shoulder," the elytra of Mr. French's insect present a *very distinct* impression *within* (rather than below) the shoulder—indeed, it is nearer to the suture than to the shoulder, but I do not think this quite sufficient distinction to warrant the bestowal of a new name.

METAXYMORPHA.

M. gloriosa, sp. nov. Nitida; modice elongata; modice angusta; splendide cœrulea, elytris (macula communi suturali apicali cœrulea et marginibus lateralibus sanguineis exceptis) testaceis; capite longitudinaliter leviter sulcato, minus fortiter vix crebre punctulato; prothorace fere ut caput punctulato, pone marginem anticum transversim impresso, lateribus leviter arcuatis, latitudine majori trans basin posita; elytris ad apicem 3-spinosis, sat fortiter striatis, striis sat subtiliter sat crebre punctulatis, interstitiis subplanis distincte sat crebre punctulatis; corpore subtus (sternorum lateribus punctulatis exceptis) fere lævi; segmento ventrali apicali (maris ?) late triangulariter emarginato. Long., 13 l.; lat., 5½ l.

This extremely fine and interesting new species of *Buprestidæ* has lately been received from N. Queensland by Mr. French. Apart from its totally different coloring and markings, it differs from *M. Grayi*, Parry, *inter alia* by the regular striation of its elytra. The cyaneous patch at the apex of its elytra, which is

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their only marking, is of the same shape as the corresponding patch in *Stigmodera amabilis*, L. and G. (as figured Tr. Ent. Soc., 1866, t. 3, fig. 1), except that its external front angle is rounded off. The elytra have the same peculiar shape as those of *M. Grayi* in the front of their external margin, being obliquely sloped so as to continue the line of the external margin of the prothorax. The apical spines of the elytra are as in *M. Grayi*.

Semnopharus apicalis, v.d. Poll., appears to be a *Metaxymorpha* and to resemble the present insect; but it is evidently quite different, as the apical spot on its elytra is described as of different shape, its abdomen is said to be of fulvous color, and its elytral interstices impunctulate.

N. Queensland.

MALACODERMIDÆ.

XANTHEROS, *Fairm.*

I cannot see anything in M. Fairmaire's diagnosis of this genus inconsistent with its identity with either *Metriorhynchus* or *Trichalus* with which its author does not even compare it. I have an insect from Queensland which, as a species, agrees so well with the description of *X. nubicollis*, Fairm., that I can hardly doubt its being identical, and it certainly appears to be a *Trichalus*. *Metriorhynchus* and *Trichalus* cannot, in my opinion, be satisfactorily treated as generically distinct.

ATTALUS.

I do not think that the two Australian species which have been attributed to this genus (*abdominalis*, Er., and *australis*, Fairm.), are satisfactorily placed there. *Attalus* is distinguished (among the *Malachiides* with 11-jointed antennæ) by its possessing elongate lamellæ on its claws and having the second joint of its anterior tarsi in the male prolonged over the next two joints. In my collection are two *Malachiides* (from Tasmania and N.S.W., the localities from which the two species were described) which agree so well with the descriptions of *A. abdominalis* and *australis* that I can hardly doubt their being those species; but they do not present the special characters just mentioned, and, moreover, present a character that in itself seems to require their separation from *Attalus*—viz., the diminutiveness of the basal joint of the tarsi. I cannot ascertain that any genus has been named to which these species can be referred and therefore propose a new name for them, treating, however, a new species as the type of the genus to provide against the possibility of my not having correctly identified *abdominalis* and *australis*.

HYPATTALUS (gen. nov., *Malachiidarum*).

Palpi breves, articulo ultimo obconico; labrum transversum; caput sat breve; antennæ ad capitis latera insertæ, minus

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elongatæ, 11-articulatæ, intus serratæ, articuli 2° parvo 3°-10° inter se plus minusve æqualibus, 11° longiori; prothorax modicus; elytra sat elongata abdomen tegentia; pedes sat elongati; tarsi modici, articulis basali vix distincto, 2° elongato, 3° 4°que brevibus; unguiculi parvi appendiculati.

This genus is sufficiently characterised among Australian genera as a *Malachiid* (having exsertile vesicles well developed), but with tarsi having their joints proportioned as (and much resembling) those of a *Clerid.*

H. punctulatus, sp. nov. Nitidus; pilis erectis minus crebre vestitus; niger, prothorace et abdominis parte mediana rufis, elytris obscure cyaneis testaceo-micantibus, antennarum articulis basalibus subtus pedibusque (plus minusve late) testaceis; capite sublævi, fronte impressa; antennis quam corporis dimidium vix brevioribus; prothorace fortiter transverso sublævi; elytris in disco distincte sat crebre antice et apicem versus obsolete punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The legs vary in color, being in some examples testaceous, with only the base of the femora and the tarsi infuscate; in other examples almost entirely infuscate. At once distinguishable from *Attalus abdominalis*, Er., and *A. australis*, Fairm. (which I believe to be congeneric), by its considerably larger size and the different color of its elytra, which are of a pale-bluish color, with a testaceous gloss. Its distinctly punctulate elytra also separate it from *abdominalis*, and the scarcely defined sutural edging of its elytra from *australis*, in which (if I have identified it correctly) the suture is defined by a well-marked fine elevated line.

S. Australia; Eyre's Peninsula.

H. elegans, sp. nov. Nitidus; pilis erectis vestitus; colore præcedenti simillimus, elytris læte cœruleis et pedibus totis nigris exceptis; capite sublævi, fronte utrinque longitudinaliter impressa; antennis quam corporis dimidium paullo longioribus; prothorace minus fortiter transverso, sublævi; elytris in disco subfortiter minus crebre antice et apicem versus magis sparsim magis obsolete punctulatis. Long., 2 l.; lat., $\frac{9}{10}$ l.

The comparatively large side of this species renders it incapable of confusion with *Attalus abdominalis*, Er., and *A. australis*, Fairm., and its elytra are punctured much more evidently than in the former, and much more sparsely than in the latter of them. From *H. punctulatus* it differs by the color of its elytra—a brilliant metallic blue—and legs (though it is quite possible the latter may be variable), by the presence of a well defined fine sutural

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edging of the elytra, by the larger and sparser punctures on its elytra, and by its less transverse prothorax.

N.S. Wales; Blue Mountains.

TENEBRIONIDÆ.

CESTRINUS.

C. Championi, sp. nov. Oblongus; piceo-niger, setis brevibus adpressis aureis sparsim vestitus; capite minus brevi, fortiter subrugulose punctulato; antennis prothoracem superantibus apicem versus leviter incrassatis; hoc leviter transverso, minus crebre (quam caput paullo minus fortiter) punctulato, antice arcuato-emarginato quam postice angustiori, postice in medio late leviter lobato, lateribus arcuatis postice leviter sinuatis, angulis posticis acute rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis quadratis sat magnis, interstitiis subconvexis rugulosis; maris tibiis anticis pone apicem intus late leviter emarginatis, tarsis anticis leviter dilatatis. Long., $5\frac{1}{2}$ l.; lat., 2 l.

Larger than any previously described species of the genus except *Bidwelli*, Hope, which is described as having rows of tubercles on the elytra, and therefore must be very distinct. The head and prothorax are much less closely punctured than in *trivialis*, Er., the sides of the latter more sinuate behind, the seriate punctures of the elytra somewhat coarser. Mr. Champion has seen this insect, and cannot identify it with any previously described.

S. Australia; Morgan.

C aspersus, sp. nov. Oblongo-ovatus; sat convexus; sat opacus; piceus, setis brevibus suberectis (alteris nigris, alteris pallidis) vestitus, antennis pedibusque plus minusve rufescentibus; capite rugulose sat crebre punctulato; antennis prothoracem haud superantibus; hoc fortiter transverso, crasse rugulose punctulato, antice minus fortiter arcuato-emarginato quam postice angustiori, postice truncato, lateribus sat arcuatis postice vix sinuatis, angulis posticis obtusis fere rectis, latitudine majori mox ante medium posita; elytris punctulato-striatis, interstitiis vix convexis rugulosis. Long., $2\frac{4}{5}$—$3\frac{1}{5}$ l.; lat., $1\frac{1}{5}$—$1\frac{3}{10}$ l.

I do not observe any well marked sexual characters in the examples of this species that have come under my notice. The presence of setæ of two colors vaguely intermingled gives the elytra a speckled appearance. This is the species referred to by Mr. Champion (Tr. Ent. Soc., 1894, p. 356) as closely allied to his *C. brevis*.

S. Australia.

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C. angustior, sp. nov. Elongato-ovatus; minus convexus; minus nitidus; piceus vel piceo-niger, setis brevibus obscuris suberectis vestitus, antennis pedibusque plus minusve dilutioribus, capite rugulose sat crebre punctulato; antennis prothoracem superantibus, articulis 9° leviter 10° fortiter transversis; prothorace leviter transverso, ut caput punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late subquadratim lobato, lateribus leviter arcuatis postice manifeste sinuatis, angulis posticis rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis quadratis sat magnis, interstitiis leviter convexis vix rugulosis; maris tibiis anticis versus apicem (ut *C. trivialis*, Er.) dilatatis, tarsis anticis leviter dilatatis. Long., $3\frac{4}{5}$—4 l.; lat., $1\frac{2}{5}$ l.

This species seems nearer to *C. trivialis*, Er., than to any other described species. Compared with it, its color is of a much more brownish (rather than black) tone, its form is narrower, and more parallel, its prothorax is less transverse (to a casual glance appearing quite as long as wide), and more distinctly lobed at the base (the lobe appearing quite squarely truncate behind when viewed with the head of the insect towards the observer), and the antennæ are more slender with their third joint proportionally longer. Mr. Champion has compared this species with the types of those described by Hope and Pascoe and finds it distinct from them.

S. Australia.

C. eremicola, sp. nov. Oblongus; piceo-niger, setis brevissimis aureis retrorsum curvatis sat sparsim vestitus, antennis pedibusque picescentibus, tarsis ferrugineis; capite fortiter subrugulose punctulato; oculis parvis; antennis prothoracem superantibus, apicem versus parum incrassatis; prothorace sat transverso, fortiter sat crebre vix rugulose (fere ut caput) punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late leviter lobato, lateribus rotundatis postice nullo modo sinuatis, angulis posticis rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis sat magnis sat rotundatis, interstitiis subelevatis sublævibus. Long., $5\frac{1}{5}$ l.; lat., $1\frac{4}{5}$ l.

This species, on account of its large size and non-tuberculate elytra, needs distinguishing only from *C. Championi*, to which it is rather closely allied; but it is readily separated from that insect by its more slender antennæ scarcely thickened towards the apex, its smaller eyes, and more transverse prothorax with coarser and much closer puncturation, the sides of which are rather strongly rounded and not at all sinuate behind. The

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elytra also are differently sculptured, the striæ containing for the most part rounded and not very closely placed punctures, whereas in *C. Championi* the puncturation of the striæ is caused by fine transverse keels connecting interstice with interstice.

Central Australia; near Oodnadatta.

C. Zietzi, sp. nov. Oblongus; piceo-niger, setis brevissimis aureis retrorsum curvatis sat sparsim vestitus, antennis tarsisque vix dilutioribus; capite crebre subrugulose sat fortiter punctulato; oculis parvis; antennis prothoracem superantibus, apicem versus leviter incrassatis; prothorace sat transverso, crebre sat fortiter nec rugulose (fere ut caput) punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late minus perspicue lobato, lateribus rotundatis postice nullomodo sinuatis, angulis posticis sat acute rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis minoribus crebris quadratis, interstitiis fere planis sublævibus. Long., $5\frac{1}{2}$ l.; lat., 2 l.

Another large species allied to the preceding, from which it differs by its antennæ somewhat more robust, its prothorax and head evidently more finely and closely punctulate, and by the sculpture of its elytra, the punctures of the striæ being similar to those of *C. Championi*, but evidently smaller. In *C. eremicola* the diameter of most of the punctures in the striæ is greater than the width of an interstice between the striæ; in this species much less. This species differs from *C. Championi* in its prothorax shaped like that of *C. eremicola*, in its smaller eyes, the smaller punctures in the elytral striæ, and the much less rugulose elytral interstices.

Central Australia; taken by Mr. Zietz near Lake Callabonna.

C. minor, sp. nov. Oblongus; piceo-niger, setis brevissimis fulvis sparsim vestitus, antennis pedibusque picescentibus, tarsis dilutioribus; capite sat crasse ruguloso, fronte impressa; oculis parvis; antennis prothoracem superantibus, apicem versus modice incrassatis, articulis 9° vix 10° leviter transversis; prothorace sat transverso, ut caput punctulato, antice arcuato-emarginato quam postice parum angustiori, postice fortiter bisinuato sed vix in medio lobato, lateribus parum arcuatis postice vix sinuatis, angulis posticis acutis, latitudine majori paullo ante medium posita; elytris punctulato-striatis, puncturis in striis sat magnis, interstitiis sat planis uniseriatim granulatis. Long., 3 l.; lat., $1\frac{1}{10}$ l.

May be distinguished superficially from its described congeners by its small size and dark antennæ in combination. It is also remarkable for the very slight curve of the sides of its pro-

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thorax (scarcely greater than in *C. punctatissimus*, Pasc.) and the very slight narrowing of the front part of that segment, in which again it resembles *punctatissimus*, but it is of very much broader and less fragile-looking form than that species, and its prothorax is very much more strongly transverse and its elytral striæ are very much more coarsely and less closely punctulate. *C. angustior* also has a prothorax with feebly arcuate sides, but it is much less transverse than that of *C. minor*, and is at its widest in the middle. The unique type of this species seems to be a female.

Victoria.

HOPATRUM.

H. Meyricki, sp. nov. Ovale; sat opacum; fuscum, setulis minutis albidis sat crebre vestitum; capite sat lato, crebre subtilius subrugulose punctulato, clypeo a fronte sulco vix manifesto diviso antice profunde triangulariter emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis brevibus, prothoracis basin haud attingentibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, ut caput punctulato, ad latera explanato (quam *H. Walkeri* paullo minus late), antice profunde emarginato, postice bisinuato, lateribus modice arcuatis postice nullo modo sinuatis, angulis omnibus acutis, latitudine majori ad basin posita; scutello ut prothorax punctulato; elytris quam prothorax parum latioribus, striatis, striis parum distincte punctulatis, interstitiis fere planis crebre subtilissime granulatis, setulis in interstitiis inæqualiter 4-seriatim dispositis; tibiis anticis sat brevibus a basi ad apicem sat fortiter dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., $5\frac{3}{5}$ l.; lat., $2\frac{4}{5}$ l.

This is a fairly well marked species. It is distinguished from all its described Australian congeners by its large size, also from the species of the group of *H. diversum*, Champion, by the deeply emarginate front margin of its prothorax, from *H. torridum* and *Walkeri* by the sides of its prothorax not at all sinuous behind the middle.

W. Australia; taken by E. Meyrick, Esq.

H. Carpentariæ, sp. nov. Ovale; sat opacum; nigrum vel piceo-nigrum, setulis obscure brunneis sat crebre vestitum; capite sat lato, crebre ruguloso, clypeo a fronte sulco sat profundo diviso antice profunde triangulariter emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis sat brevibus, prothoracis basin vix attingentibus, articulis 8-10 transversis; prothorace

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quam longiori fere duplo latiori, crebrius subtiliter granulato, ad latera explanato (quam *H. Walkeri* multo minus late), antice sat fortiter emarginato, postice bisinuato in medio vix emarginato, lateribus leviter arcuatis postice manifeste vel vix sinuatis, angulis omnibus acutis, latitudine majori ad medium posita; scutello granulato; elytris quam prothorax paullo latioribus, striatis, striis punctis confertis subquadratis impressis, interstitiis sat crebre minus perspicue granulatis [alternis (præsertim 3°) sat manifeste convexis, 2° quam cetera multo angustiori], tibiis anticis subgracilibus a basi ad apicem minus fortiter dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., 4—4½ l.; lat., 1⅘—2 l.

A somewhat inconspicuous species, apparently always covered with a very dense earthy indumentum completely concealing the characters. Its most reliable character seems to be the exceptional narrowness of the second elytral interstice, which near the apex is scarcely half as wide as the third. Compared with *H. Walkeri*, its prothorax is seen to be much less rounded laterally and to have a much more narrowly explanate border, while the granules of its elytral interstices are much less conspicuous and confused. Its elytral striæ, moreover, are scarcely rightly called "punctulate," but are divided by closely placed fine ridges which connect the interstices *inter se*. The inequality of its elytral interstices distinguishes this insect from *H. torridum* and *H. Meyricki*, and *inter alia* the separation of the clypeus from the hinder part of the head distinguishes it from the species of the *H. diversum* group, while its elongate and slender front tibiæ also distinguish it from *H. torridum*, &c.

Gulf of Carpentaria, Thursday Island, &c.

H. Adelaidæ, sp. nov. Sat late ovale; opacum; piceo-nigrum, pilis brevibus erectis aureo-fulvis dense vestitum; capite sat lato, crasse rugulose punctulato, clypeo a fronte sulco profundo diviso antice profunde rotundatim emarginato ad latera latissime (quam *H. Walkeri* magis late) producto; oculis nullo modo divisis; antennis brevibus prothoracem medium haud multo superantibus, articulis 8-10 transversis; prothorace quam longiori duplo latiori, crebre ruguloso (quam caput minus grosse) et subtiliter granulato, ad latera sat late (quam *H. Walkeri* vix minus late sed minus perspicue) explanato, antice sat fortiter emarginato, postice bisinuato, lateribus sat rotundatis postice nullo modo sinuatis, angulis anticis subacutis posticis rectis vel fere obtusis, latitudine majori paullo ante basin posita; scutello granulato; elytris quam prothorax parum latioribus, striatis (striis, binis internis exceptis, vix impressis et perspicue nec grosse punct-

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ulatis), interstitiis (internis subconvexis externis planis) subtiliter crebrius punctulatis et sparsim granulatis; tibiis anticis sat brevibus, a basi ad apicem fortiter dilatatis, angulo externo apicali acuto; tarsis setis minus crassis subtus sparsim vestitis. Long., 4—4½ l.; lat., 2⅕ l.

This is a very distinct species owing to the presence of a short erect golden-fulvous pubescence rather closely clothing the upper surface. It is also well characterised by the strongly rounded sides of its prothorax, which are not in the least sinuous behind, and by the peculiar striation of its elytra, the sutural stria and the next to it on each elytron being well marked, while the rest of the striæ are obliterated and their place supplied by mere rows of punctures. It is probably allied to *H. villigerum*, Blanch. (from N.W. Australia), which I have not seen; but I do not think it is likely to be identical with *villigerum* as the pubescence of that insect is described as "sparse" and "of a grey color," and the elytra as having "well-marked impunctate striæ." The extreme remoteness *inter se* of the localities where the two species have been taken also points to specific distinctness. It is possible that this is the *Hopatrum* taken by Mr. Walker at Port Adelaide, which Mr. Champion (Tr. Ent. Soc., 1894, p. 359) thinks is perhaps *H. villigerum*.

S. Australia; near Adelaide; also on Yorke's Peninsula.

H. cowardense, sp. nov. Sat late ovale; subnitidum; nigrum, setulis pallidis minutis minus crebre vestitum; capite modice lato, antice longitudinaliter sat crasse ruguloso, postice subtiliter granulato, clypeo antice fortiter arcuatim emarginato, ad latera minus fortiter (oculos parum excedenti) producto, oculis nullo modo divisis; antennis prothoracis basin vix attingentibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, vix manifeste punctulato, obsoletissime (in lateribus magis distincte) granulato, antice profunde arcuatim emarginato, postice bisinuato, angulis anticis acutis posticis acute rectis retrorsum vix directis, latitudine majori mox ante basin posita; scutello manifeste punctulato; elytris sublævibus, punctis seriatis vix manifeste impressis, interstitiis planatis subcoriaceis subtilissime granulatis; corpore subtus pedibusque manifeste sat crebre squamose nec fortiter punctulatis; tibiis anticis ad angulos acutos externos sat fortiter a basi dilatatis; tarsis anticis subtus pilis sat elongatis sericeis vestitis. Long., 5 l.; lat., 2½ l.

This remarkable species has not a little of the facies of *Pterohelæus*, but the fact of its tarsi being clothed with long hairs beneath (as in *H. dispersum*, Champ.), and of its clypeus being deeply excised after the *Hopatrid* fashion, shows that it

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cannot be really a *Helœid*. On the whole, I see no reason to separate it from *Hopatrum*. When alive it is covered, as usual in *Hopatrum*, with a coating of earthy matter. At once distinguished by its non-striate elytra from all its described Australian congeners.

Coward Springs, near Lake Eyre.

Since writing this description I have examined three specimens of *Hopatrum* taken by Mr. Zietz at Lake Callabonna, which appear to me to be referable to this species, although at the first glance they might be considered to represent three species all distinct from *H. cowardense*. The sculpture of the upper surface seems variable to the utmost extent, but without any other marked differences. The sight of these has led me to remove the earthy incrustation from all the specimens that I took at Coward Springs, and which were all under one stone almost in the water of the spring. I had previously cleaned a couple of them, and had assumed the others to be similar. I find, however, that among the original batch there is no little variation. The type from which the diagnosis was drawn up has the prothorax very obsoletely granulate and the elytra almost lævigate; but two specimens taken in company with it have the prothorax more evidently granulate and the elytra closely and very finely punctulate, and the elytra of one of these latter are traversed by very fine scratch-like longitudinal lines (not true striæ) and are slightly granulate. The three examples from Lake Callabonna are a little longer and narrower in form, and, therefore, might possibly represent a distinct species; but one of them is less so than the other two. The sculpture of one of the Lake Callabonna specimens (one of the more elongate two) is quite identical with that of the last described example from Coward Springs. The second example from Lake Callabonna has the elytra more decidedly granulate, with several rows of rather large very faintly impressed punctures (scarcely discernible traces of which exist in the original type), the intervals between which are not quite flat; while the third Lake Callabonna specimen has the prothorax still more decidedly, almost strongly, granulate, while its elytra bear almost regular rows of well-defined punctures, the third fifth and seventh intervals between these rows being roundly and quite strongly elevated. The original type and the last mentioned Lake Callabonna specimen could certainly not be treated as specifically identical without the knowledge of the intermediate forms.

H. darlingense, sp. nov. Ovale; subnitidum; nigrum, setulis pallidis minutis minus crebre vestitum, antennis pedibusque plus minusve picescentibus; capite minus lato fortiter minus crebre punctulato, clypeo cum capite confuso antice profunde emarginato, ad latera minus fortiter (oculos parum

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excedenti) producto, oculis haud (sed fere) divisis; antennis prothoracis basin attingentibus, articulis 9-10 vix transversis; prothorace quam longiori minus quam duplo latiori, fortius sat crebre nec rugulose punctulato, antice minus profunde emarginato, postice bisinuato, lateribus modice arcuatis, angulis anticis minus acutis posticis subrectis sat explanatis, latitudine majori mox ante basin posita; scutello ut prothorax punctulato; elytris quam prothorax sat latioribus, vix striatis, striis puncturis sat fortibus impressis, interstitiis sat planis subtiliter nec crebre punctulatis; tibiis anticis sat gracilibus apicem versus modice dilatatis; tarsis subtus pilis sat elongatis sericeis vestitis. Long., 4 l.; lat., $1\frac{3}{5}$ l.

This species belongs to the same section of *Hopatrum* as *dispersum*, Champion, and *vagabundum*, Champion, and of which *H. longicorne*, Blackb., is also a member; it is distinguished by the long silky hairs that clothe the tarsi, the somewhat exserted head with its clypeus not separated by a furrow, the comparatively narrow orbits of the eyes, the feebly emarginate front of the prothorax, the feebly (or not at all) rugulose character of the sculpture, and the almost (or quite) divided eyes. Mr. Champion describes the eyes of his species as "divided," but in the example of *H. dispersum*, which he has been good enough to send me, the two portions of the eye appear to me to be very narrowly in contact with each other at their hinder extremity as they are in the present species.

The present insect differs from *H. dispersum* by the very feeble but comparatively strongly punctured striæ of its elytra, from *H. vagabundum* by its non-granulose elytral interstices, and from *H. longicorne* (to which it is rather close) by the less crowded puncturation of the head and prothorax and by the considerably stronger punctures in the quasi-striæ of the elytra.

N.S. Wales; Darling River District.

H. longicorne, Blackb. In my description of this species (Trans. Roy. Soc. S.A., XVI., p. 40) I have introduced an accidental error, having written "capite cum prothorace *elytrisque* sat fortiter sat crebre nec rugulose punctulato." The word "elytrisque" should be excised.

H. Darwini, sp. nov. Ovale, sat breve; subnitidum; nigrum, setulis aureo-fulvis brevibus suberectis minus crebre vestitum, antennis tarsisque rufescentibus; capite minus lato fortiter crebre punctulato, clypeo cum capite confuso antice profunde emarginato, ad latera minus fortiter (oculos parum excedenti) producto, oculis haud (sed fere) divisis; antennis prothoracis basin vix attingentibus, articulis 8-10 vix con

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vexis; prothorace quam longiori duplo latiori crebre sat fortiter punctulato, antice minus profunde emarginato, postice bisinuato, lateribus sat arcuatis postice vix sinuatis, angulis anticis sat obtusis posticis sat acutis, latitudine majori vix pone medium posita; elytris quam prothorax parum latioribus, punctulato-striatis, puncturis in striis sat magnis sat quadratis, interstitiis subconvexis sparsim punctulatis; tibiis anticis gracilibus, apicem versus leviter dilatatis; tarsis subtus pilis sat elongatis sericeis vestitis. Long., 3 l.; lat. $1\frac{2}{5}$ l.

This also is of the same section as the preceding. It is rather close to *dispersum* and *vagabundum*, differing from the former *inter alia* by the squarish somewhat large punctures in its elytral striæ and the shorter vestiture of its upper surface, and from the latter (as described; I have not seen a type) by the interstices of its elytral striæ not being granuliferous. From *H. longicorne* and *darlingense* it differs *inter alia* by the much stronger striation of its elytra.

N. Territory of S. Australia; near Port Darwin.

H. Victoriæ, sp. nov. Ovale; minus opacum; nigrum, setulis griseis sat crebre vestitum; capite sat lato crebre ruguloso, clypeo a fronte sulco sat profundo diviso antice rotundatim minus profunde emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis brevibus prothoracem medium haud multo superantibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, subtiliter subcrebre indistincte granulato, ad latera explanato (quam *H. Walkeri* vix minus late), antice fortiter emarginato, postice bisinuato, lateribus leviter arcuatis postice nullo modo sinuatis, angulis omnibus leviter acutis, latitudine majori fere ad basin posita; scutello ut prothorax granulato; elytris leviter striatis, striis per rugulas crebras subtiles quasi punctulatis, interstitiis planis crebre subtiliter punctulatis obsolete granulatis; tibiis anticis modicis a basi ad apicem dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., 5 l.; lat., $2\frac{1}{2}$ l.

This species perhaps may be best compared with *H. torridum*, Champion, from which its larger size, much more widely explanate prothoracic border, wider and more absolutely flat elytral interstices, and generally finer and less rugulose puncturation render it very distinct. I have seen only a single example, which is in my own collection. It also resembles *Meyricki*, Blackb., differing from it, however, *inter alia* by the feeble rounded emargination of the front of its clypeus.

Victoria.

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ULOMA.

U. depressa, Pasc. This name seems to have been provided for the same insect as *U. consentanea*, Perroud. The latter is the older name. I may remark that *Achthosus*, Pasc., does not seem to differ from *Uloma* in any way likely to be really generic, although Pascoe in characterising the former does not make any reference to the latter.

ADELIUM.

A. ellipticum, sp. nov. Elongato-ovale, postice acuminatum; æneum, antennis tarsisque rufescentibus; capite subtiliter, prothorace subtilissime, sparsim punctulatis; hoc antice angustatum, lateribus pone medium rotundatim dilatatis; elytris subtiliter punctulato-striatis, interstitiis sat planis vix manifeste punctulatis. Long., 7—7½ l.; lat., 2½—3 l.

A remarkably distinct species. Mr. Champion informs me that it is in the collection of Mr. F. Bates under the name I have called it by, but I cannot find that any description has been published.

N.S. Wales; Clarence River district.

LICINOMA.

L. sylvicola, sp. nov. Nigra; nitida; capite sparsim subtiliter punctulato, antice transversim late profunde sulcato; antennarum articulo apicali quam 10^us^ paullo longiori; prothorace leviter transverso, postice leviter angustato, sparsim leviter punctulato, lateribus leviter arcuatis, disco foveis nonnullis impresso; elytris sat fortiter punctulato-striatis, interstitiis sat planis lævibus. Long., 4—4½ l.; lat., 1½—1⅗ l.

Mr. Champion has done me the favor of comparing this species with the two described by Mr. Pascoe and tells me it is distinct from them. It is obviously very different from *L. violacea*, Macl., of which the elytra are said to be "of a violet hue" and the head is described as "roughly punctate, subrugose." Unfortunately, Mr. Pascoe's descriptions are not of a kind to facilitate the indication of distinctive characters, and in this case I must limit myself to saying that *L. nitida*, Pasc., as compared with the present insect, appears to be differently colored and to have finer elytral striation, while *L. elata*, Pasc., is a larger and also differently colored species.

N.S. Wales; Forest Reefs; taken by Mr. Lea.

ANTHICIDÆ.

SYZETON.

S. lætus, Blackb. This species is identical with *S.* (*Anthicus*) *abnormis*, King. It cannot be rightly referred to *Anthicus*—

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indeed (as I have previously remarked), it is doubtful whether *Anthicus* and *Syzeton* can rightly be associated in one *family*. King's is the older name.

CURCULIONIDÆ.

CYLAS.

C. formicarius, Fab. According to M. Faust (Ann. Soc. Ent. Fr., 1893, p. 513) *C. turcipennis* (Bohem.), Sch., is not distinct from this species, and therefore *turcipennis* ought to be regarded as a synonym. In April of this present year I recorded the occurrence in Australia of *C. turcipennis*.

PHYTOPHAGA.

PAROPSIS.

This genus contains more described Australian species than any other except *Stigmodera*. Mr. Masters' catalogue—1887—enumerates 271 species, and 15 have been added since. The only attempt, so far as I know, at a comprehensive treatment of the species is found in the Ann. Soc. Ent., Belg., 1877, where Dr. Chapuis, in describing a large number of new species, takes the opportunity to subdivide the genus into four groups, and enumerates the species known to him belonging to each group, but omits those of previous authors which he had not identified. Dr. Chapuis' groups are founded on the sculpture of the elytra, as follows:—Group I. Elytral punctures without any seriate longitudinal disposition—27 species. Group II. Differs from I. by the presence of longitudinal smooth spaces among the punctures of the elytra—19 species. Group III. Each elytron bears ten longitudinal rows of punctures—118 species. Group IV. Each elytron bears 20 longitudinal rows of punctures—63 species. This method of subdividing *Paropsis* appears to me the best available—at any rate I cannot find a better. In the Journal of Entomology for December, 1864, Mr. J. S. Baly had commenced a systematic work on *Paropsis*, of which, however, only a single part—dealing with 20 species—appeared. Mr. Baly proposed to divide the genus into only two sections—apparently his first section equalled Dr. Chapius' first and second combined, and his second Dr. Chapuis' third and fourth combined. I have lately had the good fortune to obtain a large number of species of *Paropsis* from Dr. Chapuis' collection ticketed with his names, and with this assistance have been enabled to ascertain the names of the greater part of the species in my collection and in some other collections to which I have had access; and I think I am in a position to furnish a revision of the genus, which, though doubtless needing correction, may yet serve as a useful basis for

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future work. In this present memoir I offer to the Royal Society a revision of the species hitherto described, together with descriptions of 18 new species, belonging to Dr. Chapuis' Group I., and hope in the future to be able to offer revisions of the three other groups.

A few preliminary remarks seem to be called for as to the history of the genus. It was founded in 1807 by Olivier, and again under a different name—*Notoclea*—in the following year by Marsham, each of those authors describing a considerable number of species. Previously to either of these authors, however, several species had been described by Fabricius under the name *Chrysomela*, together with numerous other species, for most of which modern classification has found it necessary to provide other generic names. In subsequent years species of *Paropsis* were described by W. S. Macleay (1827), Boisduval (1835), White (1841), Newman and Erichson (1842), Gory (1845), Germar (1848), Bohemann (1858), Stäl and Motschulsky (1860), Fauvel (1862), Baly (1864), Clark (1865), Chapuis (1877), and Blackburn (1890, 91, and 92).

Turning now to the consideration of the species of *Paropsis* referable to Dr. Chapuis' Group I., I think that the catalogue as given by its author may be regarded as containing all the previously described species that there is good reason for attributing to the group except *Parryi*, Baly, and *Lownei*, Baly; although it is possible that some of the insufficiently described species—especially some of Boisduval—may sooner or later be found by inspection of types to require adding to them. The catalogue, however, contains names of two species that do not seem entitled to appear there, viz., *crocata*, Boisd., and *atomaria*, Marsh. The former of these is not intelligibly described, and in my opinion Dr. Chapuis should have omitted it altogether, as he has done most of Boisduval's names, unless he could give the assurance that he had inspected the type, which it seems almost certain he had not done. I have a specimen from Dr. Chapuis' collection ticketed "*crocata*, Adelaide," which is unquestionably identical with *Waterhousei*, Baly. Among the large number of specimens of the genus that I have examined I have not seen this species from any locality outside S. Australia, while Boisduval's *crocata* is presumably from N.S. Wales. There seems no reason, therefore, to drop Baly's name of the S. Australian insect in favor of a name founded on a species from a distant locality to which no intelligible description is attached, and I accordingly omit *crocata* altogether. As regards *atomaria*, Marsh., it is a *nom. præocc.*, *Paropsis atomaria*, Ol., being a very different insect; and it is remarkable that this escaped Chapuis' notice. Chapuis gives *charybdis*, Stäl., as a synonym of *atomaria*, Marsh.; and Baly

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thinks that *dilatata*, Er., is probably another synonym of it, he also overlooking the existence of *P. atomaria*, Oliv. Under these circumstances it seems perhaps best to take provisionally the oldest of the names that have been regarded as synonymous and to call the insect *dilatata*, Er., until some reason be produced to the contrary. At all events *atomaria*, Marsh., cannot stand.

Thus corrected, Dr. Chapuis' Catalogue of Group I. contains the names of 27 species, and of these I have more or less reliable types of 25—some few of them identified by description, and most of them represented by types from Chapuis. The two that I do not know are *nigroscutata*, Chp., and *formosa*, Chp.; the former of these is insufficiently described and may possibly be my *montana* or *debilitata*; *formosa* I feel confident that I have not seen.

Dr. Baly's descriptions of the 11 species of this group that bear his names and his re-descriptions of the eight other species dealt with in his paper referred to above are in most respects very satisfactory, but two remarks regarding them seem called for—the one, that they include as main characters the form of internal sexual organs, which, requiring dissection for examination, are obviously not easily available to the student (I have omitted all reference to these organs in my descriptions, from want of material for dissection); the other, that Baly's statements of the comparative length, breadth, &c., of prothorax, elytra, &c. are very unreliable, being evidently not founded on measurement; thus that author makes the prothorax of many species three times (or even more) as broad as long, whereas I have not seen any *Paropsis* (at any rate of Group I.) whose prothorax by measurement is even very nearly three times as broad as long, though to a casual glance some appear so; and again, the proportion of the length of the elytra to their breadth is always over-stated by Baly, those organs appearing to the eye considerably longer as compared with their width than actual measurement shows them to be. One of the species *(P. suspiciosa)* dealt with by Baly is not a member of Chapuis' Group I.

Although the species of *Paropsis* forming this group are for the most part very satisfactorily distinct *inter se*, and unlikely to be reduced in number by subsequent investigation, their distinctive characters are by no means easy to specify sufficiently clearly in words for confident identification—often consisting in differences of form or of sculpture that it is difficult to express definitely. Consequently I have found it necessary to adopt a system of indicating the measurements with exactness, as I find these very constant in either sex of each species. It will be necessary then to explain—first, that by the "height" of a species I mean the distance (the insect being so regarded that the suture

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of the elytra is in its upper outline and the lateral margin is in its lower outline and the humeral angle seems directed downward) from the highest point of the upper outline to the lower outline, *i.e.*, the length of that portion of a pin passing from one to the other of these points, which would be in the body of the insect; second, that the length and breadth of the elytra is ascertained on the undersurface, the length being the length of a line from the apex of the elytra to the point where a transverse line from shoulder to shoulder intersects the longitudinal middle line of the insect (usually on the prosternum), the *breadth* being the greatest distance between the lateral edges of the elytra; in measuring the breadth allowance must be made for any displacement there may be of the elytra. It is impossible to measure either length or breadth of elytra reliably on the upper surface owing to the great convexity of those organs.

After long and careful consideration, I have been unable to make use of the external sexual organs as specific characters. They are exceedingly well marked inter-sexually, consisting in the shape of the tarsal joints, the length of the antennæ and the form of the apical ventral segment, and in some species in the outline of the body—but they do not vary much specifically. While this undoubtedly increases the difficulty of distinguishing species, it removes the objection to describing species on the characters of one sex alone, as it is easy to judge with tolerable certainty what would be the characters of the other sex. This remark has reference merely to Group I. of the genus; in at least one of the other groups there are species in which sexual characters seem more important.

In the following table will be found the distinctive characters, then, of 46 species, which is the total number known to me today as attributable to Dr. Chapuis' first group of *Paropsis;* viz., 25 enumerated in Dr. Chapuis' Catalogue, three since described by myself, and 18, of which the descriptions are furnished below.

Tabulation of those of the described species of *Paropsis* whose elytral puncturation is entirely confused ("Group I." of Chapuis):—

A. Front angles of prothorax mucronate.
  B. Sides of prothorax not (or scarcely) bisinuate.
    C. Scutellum deep black.
      D. Prothorax more than twice as wide as long ... ... *Parryi*, Baly.
      DD. Prothorax not more than twice as wide as long.
        E. Disc of elytra with raised wart-like inæqualities ... . *Lownei*, Baly.
        EE. Disc of elytra devoid of wart-like inæqualities.
          F. Puncturation of elytra moderately close (as in *P. Lownei*) ... ... *montana*, Blackb.

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FF. Puncturation of elytra much more close ... ... *debilitata*, Blackb.
CC. Scutellum pallid or a little infuscate.
D. Elytra moderately and not very closely verrucose.
E. Large species (long. 5 l. or more) with front angles of prothorax strongly mucronate.
F. Elytral puncturation well defined over the whole surface.
G. Underside deep black ... ... *tasmanica*, Baly.
GG. Underside pallid or more or less infuscate.
H. Antennæ very long (two-thirds or more of whole body), with third joint much longer than first ... ... *longicornis*, Blackb.
HH. Antennæ normal.
I. Elytral puncturation moderately close.
J. Humeral angles normal.
K. Elytra scarcely wider than long ... ... *variolosa*, Marsh.
KK. Elytra considerably wider than long ... ... *affinis*, Blackb.
JJ. Humeral angles exceptionally strongly produced (elytra longer than wide) *angusticollis*, Blackb.
II. Elytral puncturation more sparse.
J. Elytra wider than long.
K. Elytral puncturation almost wanting near middle of suture ... ... *aciculata*, Chp.
KK. Elytral puncturation less obsolete near middle of suture ... ... *Wilsoni*, Baly.
JJ. Elytra wider than long ... *advena*, Blackb.
FF. Elytral puncturation on disc buried in rugulosity ... ... *cerea*, Blackb.
EE. Small species (less than long. 4½ l.); front angles feebly mucronate.
F. Prothorax sparsely punctulate.
G. Elytra normally convex.
H. Very nitid ... ... *ornata*, Marsh.
HH. Much less nitid ... ... *Bovilli*, Blackb.
GG. Elytra gibbous behind scutellum (as in *consimilis*, Baly) ... *rufitarsis*, Chp.
FF. Prothorax on disc closely and evenly punctulate ... . *Paphia*, Stäl.
DD. Elytra (at least towards apex) very strongly and very closely verrucose.
E. Elytra normally convex.
F. Greatest height of the insect is in front of middle of elytra.
G. Elytra not wider than long ... *reticulata*, Marsh.
GG. Elytra wider than long ... *insularis*, Blackb.
FF. Greatest height of the insect is behind the middle of the elytra ... *dilatata*, Er.

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EE. Elytra gibbous (as in *P. consimilis*, &c.) *gibbosa*, Blackb.
DDD. Interstices of the elytral punctures quite flat ... ... *pictipes*, Chp.
BB. Sides of prothorax strongly bisinuate.
C. Prosternum longitudinally concave.
D. Elytra with raised colored blotches forming a defined pattern.
E. The blotches on elytra comparatively small.
F. The blotches not consisting of conspicuous vittæ.
G. Elytra evenly convex.
H. Underside black ... ... *lutea*, Marsh.
HH. Underside pallid.
I. Prosternum very wide, bisulcate ... ... *geographica*, Baly.
II. Prosternum narrower, simply sulcate ... ... *marmorea*, Oliv.
GG. Elytra gibbous (as in *P. gibbosa*, &c.).
H. One of the conspicuous elevated pale elytral spots is a common one a little in front of middle of suture .. .. *colorata*, Blackb.
HH. None of the conspicuous pale spots is placed on the suture *consimilis*, Baly.
FF. The blotches consist of conspicuous vittæ ... ... *propinqua*, Baly.
EE. At least one of the elytral blotches large, with diameter equal to one-quarter the width of an elytron ... *maculata*, Marsh.
DD. Elytra not ornamented with a pattern formed by raised colored blotches.
E. The wart-like inequalities of the elytra not running in longitudinal series.
F. Underside more or less pallid.
G. Elytra moderately or feebly verrucose.
H. Elytra not or only moderately ovate in form.
I. Elytra without any trace of transverse dark markings.
J. Puncturation of elytra moderately close (more close than in *P. obsoleta*, Oliv.).
K. The color of the elytral punctures black, in strong contrast to the pale yellowish derm ... *roseola*, Baly.
KK. The elytral punctures concolorous, or nearly so, with the derm.
L. Prothorax considerably more than twice as wide as long (color pale greenish or greenish yellow) ... *glauca*, Blackb.

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LL. Prothorax very little more than twice as wide as long (color dark brown) ... *yilgarnensis*, Blackb.
JJ. Puncturation of elytra very sparse (more so than in *P. obsoleta*) ... ... *Zietzi*, Blackb.
II. Elytra with distinctly traceable transverse fasciæ, or rows of blotches placed transversely.
J. Size comparatively small (long., 5 l., or less).
K. Sides of prothorax exceptionally feebly bisinuate *obsoleta*, Oliv.
KK. Sides of prothorax normal (*i.e.*, rather strongly bi-emarginate) ... ... *variegata*, Blackb.
JJ. Size much larger (long., about 6 l.) ... ... *mystica*, Blackb.
HH. Elytra very strongly dilated hindward in both sexes ... *mutabilis*, Blackb.
GG. Elytra very strongly verrucose, especially near apex.
H. Elytra normally convex.
I. Punctures of the elytra moderate (much as in *P. porosa*, Er., &c.) ... ... *carnosa*, Baly.
II. Punctures of the elytra very large ... ... *latissima*, Blackb.
HH. Elytra sub-gibbous behind scutellum (as in *P. consimilis*, &c.) ... ... *convexa*, Blackb.
FF. Underside black ... ... *bella*, Blackb.
EE. The wart-like inæqualities of the elytra forming longitudinal series... *intermedia*, Blackb.
CC. Prosternum convex in its front half ... *porosa*, Er.
AA. Front angles of prothorax not mucronate.
B. Lateral margin of elytra normal.
C. Elytral derm unicolorous fusco-testaceous (length, about 4½ l.) ... ... *irrorata*, Chp.
CC. Elytral derm variegated with fulvous and black (length, about 5½ l.) ... ... *fulvo-guttata*, Baly.
BB. Elytra with a conspicuous thickened margin (as in *P. longicornis*) ... ... *Waterhousei*, Baly.

P. montana, sp. nov. Late ovalis (mare subrotundato); convexa; sat nitida; subtus atra; supra (scutello atro excepto) testacea plus minusve rufescens, pedibus atris, femoribus tibiisque flavo-variegatis, antennis apicem versus nigris; capite sat fortiter inæqualiter punctulato, linea longitudinali impresso; antennis quam corporis dimidium (maris sat, feminæ parum) longioribus, articulo 3° quam 1^us^ vix longiori; prothorace quam longiori vix plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat

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fortiter sat crebre vix acervatim (ad latera crasse) punctulato, interstitiis subtilissime sparsissime punctulatis, lateribus leviter arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus haud longioribus (maris brevioribus), minus crebre (fere ut *P. Wilsoni*) punctulatis, interstitiis sparsim punctulatis vix (latera apicemque versus paullo magis distincte) elevatis, angulis humeralibus (a latere visis) rotundatis deorsum sat productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., mas., $6\frac{1}{5}$ l.; lat., $5\frac{1}{10}$ l. Fem., long., 7 l.; lat., $5\frac{1}{5}$ l.

This species comes near *P. Parryi*, Baly, and *P. Lownei*, Baly. From the former it differs by its shorter form, elytral interstices even less raised, less transverse prothorax, rufous elytra, &c.; from the latter by its elytra being devoid of distinct wart-like inæqualities, its head and prothorax entirely devoid of black markings, &c.

N.S. Wales; Blue Mountains.

P. debilitata, sp. nov. Fem. Sat late ovalis; convexa; sat nitida; subtus atra (sternis plus minusve flavis exceptis); supra (scutello atro excepto) sordide flava, pedibus (exempli descripti) flavis (genubus tibiarum basi et apice tarsisque nigris exceptis), antennis (parte basali excepta) nigris; capite sat fortiter inæqualiter punctulato, linea longitudinali antice impresso; antennis quam corporis dimidium parum longioribus, articulo 3° quam 1^us^ haud longiori; prothorace quam longiori duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat fortiter sat crebre vix acervatim (ad latera crasse) punctulato, interstitiis vix manifeste punctulatis, lateribus leviter arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus vix longioribus, sat crebre subtilius (quam *P. variolosi*, Marsh., paullo magis crebre magis subtiliter) punctulatis, interstitiis sparsim punctulatis vix elevatis, angulis humeralibus (a latere visis) rotundatis vix deorsum productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., 7 l.; lat., 5 l.

Another ally of *P. Parryi* and *Lownei*, differing from the latter by its elytra devoid of raised inequalities, though the interstices are not quite flat as they are in *P. Waterhousei*, Baly; and from the former (which it resembles in the general color of the upper surface) by the much finer and closer puncturation of its elytra. It is closely allied to *P. montana*, but differs in its color and in the much closer puncturation of its elytra which is not much less close and fine than in *P. Waterhousei*.

Australia; I do not know the exact locality.

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P. longicornis, sp. nov. Lata; modice (mari quam femina minus) convexa; minus nitida; testacea plus minusve rufo-tincta, antennis apicem versus mandibulorum apicibus et corporis supra puncturis plurimis nigricantibus; antennis quam corpus totum tertia (vel minore) parte brevioribus, articulo 3° quam 1^us^ multo longiori; capite prothoraceque acervatim sat fortiter (hoc ad latera crasse) punctulatis, interstitiis sat lævibus; prothorace quam longiori paullo plus quam duplo latiori (sc. ut 8 ad $3\frac{1}{2}$), antice fortiter sinuatim emarginato, postice arcuato, lateribus sat arcuatis, angulis anticis mucronatis sed minus acutis posticis fere nullis; elytris margine laterali insigni crasso instructis, confuse sat æqualiter nec crebre punctulatis, puncturis (his in parte ultra-discoidali exceptis) nigris, interstitiis basin versus vix manifeste apicem versus gradatim magis fortiter elevatis, interstitiis alteris lævibus alteris puncturas singulas ferentibus, angulis humeralibus (a latere visis) vix deorsum directis, margine pone humerum laterali vix concavo; prosterno sat angusto, longitudinaliter sulcato. Long., $6\frac{1}{2}$—7 l.; lat., 5—$5\frac{1}{10}$ l.

The general color is testaceous with a beautiful pink tone overspreading most of the surface. The punctures on the prothorax are mostly concolorous with the surface, but some are black—usually in clusters; the elytral punctures are all black, except those on the dilated margin. Among the species (of Chapuis' first group of *Paropsis*, to which this insect belongs) having the upper and under surfaces and legs pallid, this species may be at once known by the well-defined thickened lateral edging of its elytra (which is much stronger than in any other *Paropsis* known to me except *P. Waterhousei*) and its long antennæ, which by measurement are fully two-thirds of the length of the whole body in the female and a little longer still in the male. Its nearest ally, however, is the species that I take to be *P. Parryi*, Baly. From *P. Parryi* it departs (according to the description of that species) by its very different coloring in almost every part (*Parryi* having underside scutellum and most of legs and antennæ black, and elytral punctures not black); and also differs from the species that I take to be *Parryi* by its much shorter form, greater closeness of the elytral verrucæ near the apex, less rounded-off apex of the humeral angle, &c.

Victoria; on *Eucalypti*; on the higher mountains of the Alpine Range.

P. cerea, sp. nov. Mas. Sat late ovalis; fortiter convexa; minus nitida; tota (mandibulorum apice nigro excepto) obscure flava (ut cerea), elytris mox intra marginem dilatatam vix perspicue longitudinaliter infuscatis; antennis quam corporis dimidium vix longioribus, articulo 3° quam 1^us^ parum

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longiori; capite prothoraceque acervatim minus fortiter (hoc ad latera sat crasse) punctulatis, interstitiis punctururum (in capite sat perspicue in prothorace vix manifeste) subtiliter punctulatis; prothorace quam longiori paullo plus quam duplo (ut $8\frac{1}{2}$ ad 4) latiori, antice fortiter sinuatim emarginato, postice bisinuato, lateribus sat arcuatis, angulis anticis mucronatis sat acutis posticis fere nullis; elytris suturam versus sparsim subtilius punctulatis, aliunde crasse confuse rugatis (vix perspicue punctulatis), interstitiis inæqualiter verruciformibus sublævibus, angulis humeralibus (a latere visis) manifeste deorsum directis, margine pone humerum laterali sat concavo; prosterno sat lato longitudinaliter sulcato. Long., 6 l.; lat., $4\frac{4}{5}$ l.

The whole insect, except the apex of the mandibles, is of a dull flavous color and looks as if it were made of wax. The sculpture of the elytra, except close to the suture, appears to consist of a system of closely-placed deep sinuous wrinkles, among which the interstices are more or less elevated or verrucose; towards the front part of the dilated margin there are some coarse punctures distinctly visible.

Queensland.

P. affinis, sp. nov. Fem. Subrotundata; valde convexa; sat nitida; testaceo-brunnea, antennis extrorsum atris, mandibulorum apice elytrorum puncturis et sternorum partibus nonnullis infuscatis; capite modice punctulato, pone clypeum æquali; antennis modicis, articulo 3° quam 1^{us} vix longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter vix sparsim (ad latera crassissime) punctulato, interstitiis vix manifeste punctulatis, lateribus modice arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus paullo latioribus, fere ut *P. variolosi*, Marsh., sculpturatis (*i.e.*, modice crebre fusco-punctulatis et verrucis sat numerosis obsolete elevatis ornatis), angulis humeralibus (a latere visis) rotundatis deorsum parum productis; prosterno modico longitudinaliter sulcato. Long., $6\frac{1}{2}$ l.; lat., $4\frac{4}{5}$ l.

This species, perhaps, is nearest to *P. variolosa*, Marsh., from which it differs by its shorter form and greater convexity (the height of the insect being to the length of the elytra as 7 to 12; in *variolosa* it is as 7 to 13), its antennæ deep black outside the fifth joint, its head not longitudinally impressed, &c. I have seen only a single specimen of this insect, which is in my own collection.

N.S. Wales; Clarence River District.

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P. advena, sp. nov. Fem. Ovalis; convexa; sat nitida; obscure flava, mandibulorum apice labro clypeo antice et elytrorum vittis nonnullis nigricantibus; antennis extrorsum paullo infuscatis; capite modice punctulato, linea subtili longitudinali leviter impresso; antennis quam corporis dimidium brevioribus, articulo 3° quam 1^{us} haud longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter subcrebre (ad latera crassissime) punctulato, interstitiis obsolete subtilissime punctulatis, lateribus sat arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus paullo longioribus, minus crebre (fere ut *P. Wilsoni*, Baly) sat fortiter punctulatis, puncturis in vittis latis nigricantibus, interstitiis leviter inæqualiter elevatis, angulis humeralibus (a latere visis) rotundatis deorsum parum pro ductis; prosterno modice lato longitudinaliter sulcato, sulc fundo postice carinato. Long., $6\frac{1}{2}$ l.; lat., $4\frac{4}{5}$ l

The comparatively elongate form of this insect, with elytra by measurement distinctly (by about $\frac{1}{12}$ of their width) longer than together wide, together with the comparatively sparse punctuation of its elytra, will distinguish it from its allies. The markings on the elytra of my unique example are very distinctive, but it is doubtful whether they are constant; they consist of a number of wide dark vittæ (on which the punctures are nearly black) and may be thus described: from a point on the suture slightly in front of the apex five vittæ diverge forwards (*i.e.*, towards the front of the elytra)—one up the suture, one close to the lateral margin, and three at equal intervals between; the sutural vitta is continuous to near the scutellum, a little behind which it ceases; the others extend to the base, but the second (counting from the suture) is widely interrupted in the middle; the external three all become very faint about the middle and then becoming well defined again coalesce in a large blotch on and around the humeral callus. The width of these vittæ is such that they are wider than the intervals between them; the first, third, and fourth are the widest.

Australia; exact habitat unknown, but it is probably in S.W. Australia.

P. angusticollis, sp. nov. Fem. Ovalis; convexa; minus nitida; testacea, antennis versus apicem mandibulisque nigricantibus; antennis quam corporis dimidium brevioribus, articulo 3° quam 1^{us} haud longiori; capite sparsim punctulato; prothorace quam longiori vix duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato et in medio lobato (lobo postice subtruncato), in disco sparsissime sat subtiliter latera versus magis crasse paullo magis crebre punctulato,

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interstitiis sparsim subtilissime punctulatis, lateribus sub sinuatim arcuatis, angulis anticis mucronatis posticis fere nullis; elytris (parte antica suturali excepta) subobsolete verrucosis, minus crebre (fere ut *P. Wilsoni*, Baly, sed magis subtiliter) punctulatis, interstitiis sparsim subtilissime punctulatis, angulis humeralibus (a latere visis) rotundatis deorsum sat fortiter (magis quam *P. variolosi*, Marsh.) directis; prosterno lato sulcato, sulci fundo sat fortiter carinato. Long., 7¾ l.; lat., 5 l.

In the example on which this description is founded the elytral punctures are only slightly infuscate; in a second specimen they are almost black. The most conspicuous character of this fine large species seems to lie in the narrowness of its prothorax; a second character consists in the evident though slight sinuosity of the lateral margin of its prothorax.

Australia; exact habitat uncertain, probably N.S. Wales.

P. Bovilli, sp. nov. Fem. Late ovata; sat convexa; sat nitida; testaceo-brunnea (mandibulorum apice et in elytris verrucarum interstitiis nigricantibus labroque albido exceptis); antennis quam corporis dimidium vix longioribus, articulo 3° quam 1^us^ haud longiori; capite prothoraceque acervatim modice fortiter hoc ad latera sat crasse punctulatis, interstitiis minus crebre sat perspicue punctulatis; prothorace quam longiori duplo latiori, antice fortiter sinuatim emarginato, postice bisinuato, lateribus sat arcuatis, angulis anticis mucronatis sat acutis posticis fere nullis; elytris sat fortiter minus crebre punctulatis, crebre verrucosis (fere ut *P. carnosæ*, Baly), angulis humeralibus (a latere visis) rotundatis deorsum parum directis, margine pone humerum laterali vix concavo; prosterno lato (vix quam *P. geographicæ*, Baly, angustiori) longitudinaliter sulcato. Long., 4 l.; lat., 3 l.

The sculpture of the elytra is extremely like that of *P. carnosa*, Baly, but the raised spaces all being of testaceous-brown color and the interstices all blackish the appearance is that of a black surface covered with closely and regularly placed raised pale blotches. The elytral sculpture compared with that of *P. reticulata* shows verrucæ almost as closely placed, but individually larger and not becoming smaller and more crowded towards the apex. This species is not capable of confusion with any other yet described; it most resembles the species that I take (and my determination agrees with Dr. Chapuis') to be *P. ornata*, Marsh., which, however, is a considerably smaller and much more nitid species with very much less closely verrucose elytra. Viewed from the side the summit of the outline curve of the upper

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surface is just about the centre of the insect (*i.e.*, a little in front of the middle of the elytra), and the greatest height (the insect still being inspected from the side) is about half the length of the elytra.

N. Territory of S. Australia.

P. colorata, sp. nov. Fem. Ovata; convexa, elytris ante medium (ut *P. consimilis*, Baly) subgibbosis; lutea, antennis extrorsum obscurioribus, elytris maculis lævibus pallide flavis plurimis ornatis, ex his 4 quam ceteræ majoribus (sc. 1 pone basin ad latitudinem mediam, 1 mox intra marginem lateralem ad longitudinem mediam, 1 longe pone longitudinem mediam suturam versus, 1 communi in sutura ante medium); capite sat crebre sat subtiliter punctulato, subtiliter longitudinaliter impresso; antennis quam corporis dimidium brevioribus, articulo 3° quam 1^us^ vix longiori; prothorace quam longiori duplo latiori, antice sinuatim fortiter emarginato, postice leviter bisinuato, in disco subtiliter sparsius acervatim (ad latera crasse) punctulato, interstitiis subtilissime punctulatis, lateribus minus arcuatis profunde bis emarginatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus vix latioribus, sat crebre (fere ut *P. marmoreæ*, Oliv.) fusco-punctulatis, interstitiis subtilissime sparsissime punctulatis antice planis apicem versus obsolete rugulosis, angulis humeralibus (a latere visis) sat rotundatis deorsum parum productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., 5 l.; lat., $3\frac{9}{10}$ l.

This species is very like *P. marmorea*, Oliv., having its elytral pattern scarcely different, except in the larger spots being larger than the corresponding ones in *marmorea* and the spot near the lateral margin being much more conspicuous; but these characters may be variable. From all the allied species having a pattern (except *consimilis*), this one, however, is easily separated by its elytra not evenly convex, but with a distinct indication of rising into a kind of hump a little behind the base, and from them all it is distinguished also by its elytral interstices quite flat except near the apex, and even there only feebly rugulose.

Queensland; unique in my collection.

P. glauca, sp. nov. Fem. Sat late ovalis; convexa; minus nitida; sordide flavo-viridis; capite sat crebre sat subtiliter punctulato, antice breviter longitudinaliter impresso; antennis quam corporis dimidium vix longioribus, articulo 3° quam 1^us^ sub-breviori; prothorace quam longiori plus quam duplo latiori, antice sat fortiter vix sinuatim emarginato, postice leviter bisinuato, in disco sat crebre sat æqualiter minus fort-

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titer (ad latera crasse) punctulato, interstitiis subtilissime punctulatis, lateribus sat arcuatis sat fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus vix latioribus, crebre fortiter (quam *P. Waterhousei* paullo magis crebre magis crasse) punctulatis, interstitiis subtilissime sparsim punctulatis leviter sat æqualiter rugulosis, angulis humeralibus (a latere visis) rotundatis vix deorsum productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., $4\frac{1}{2}$—$5\frac{1}{3}$ l.; lat., $3\frac{1}{3}$—$3\frac{1}{2}$ l.

This is a very distinct species bearing a general superficial resemblance to *P. Waterhousei*, Baly, but with the prothorax bisinuate laterally, the elytra more closely and less finely punctulate with the interstices of their punctures distinctly more rugulose, &c.

S. Australia.

P. mystica, sp. nov. Fem. Ovalis; convexa; sat nitida; testacea, elytrorum disco bifasciatim infuscato; capite cum prothorace ut præcedentis sculpturato sed illo haud longitudinaliter impresso; antennis quam corporis dimidium haud longioribus, articulo 3° quam 1^{us} haud longiori; prothorace quam longiori vix duplo latiori, antice fortiter vix sinuatim emarginato, postice bisinuato, lateribus minus arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus vix longioribus, sparsim sat fortiter (fere ut *P. obsoletæ*, Oliv.) punctulatis, interstitiis subtilissime punctulatis leviter subobsolete (fere ut *P. obsoletæ*) convexis, angulis humeralibus (a latere visis) minus rotundatis vix deorsum productis; prosterni parte mediana sat lata, longitudinaliter sulcata. Long., 6 l.; lat., $4\frac{1}{4}$ l.

This species closely resembles *P. obsoleta* in respect of the sculpture of its elytra, but differs much from that insect in its larger size, much less transverse and more strongly punctured prothorax, narrower form, &c. The markings on its elytra (if constant) furnish a very distinctive character. The whole disc of each elytron is of a dark-fuscous color (the punctures on this color being also dark-fuscous), except a space in front of and another behind the middle; thus the lateral portions of the elytra are of the general color (testaceous), while the rest of the surface presents dark coloring along the base and two dark fasciæ, one at, the other behind, the middle.

S. Australia.

P. variegata, sp. nov. Mas. Late ovalis; subrotundata; convexa; sat nitida; rufo-testacea, antennis apicem versus plus minusve infuscatis, capite prothoraceque fusco-variegatis,

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elytrorum interstitiis hic illic irregulariter flavis; capite sat crebre minus fortiter punctulato, longitudinaliter impresso; antennis quam corporis dimidium longioribus, articulo 3° quam 1^us^ vix longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter (ad latera crasse) punctulato, lateribus modice arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus sat latioribus, fortiter sat crebre (fere ut *P. carnosæ*, Baly) fusco-punctulatis, interstitiis lævibus obsolete irregulariter (fere ut *P. obsoletæ*, Oliv.) inæqualibus, angulis humeralibus (a latere visis) rotundatis, vix deorsum productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., 4½ l.; lat., 3⅘ l.

This species is much like *P. carnosæ*, Baly, in general appearance and is similarly colored, having many of the rugulose interstices of the elytra yellow so as to produce the appearance of the elytra bearing numerous small yellow specks, which are unevenly distributed in such fashion that the elytra can be regarded as having yellow as their ground color and three indistinct reddish fasciæ as their markings; in none of the specimens I have seen of this insect is there any trace of the obscure dark piceous patches that are generally more or less traceable on the elytra of *P. carnosa*. From *P. carnosa* the present species differs in the prothoracic puncturation being less close and being arranged in clusters, also in the interstices of the elytral puncturation being less convex—so that the punctures themselves are much more conspicuous, the punctures in *P. carnosa* being less noticeable on account of the depth of the inequalities in which they lie. I have a single female example which is too much broken for exact description, but evidently scarcely differs from the male except in the usual sexual respects, *i.e.*, narrower form, shorter antennæ, &c.

N.S. Wales; Queanbeyan (Lea), &c.

P. mutabilis, sp. nov. Mas. Late ovata, apicem versus fortiter dilatata; convexa; minus nitida; sordide viridis (nonnullorum exemplorum mortuorum colore plus minus in rufo-testaceum transeunti), antennis apicem versus infuscatis; capite longitudinaliter vix impresso cum prothorace sat crebre fortius punctulato (fere ut *P. carnosæ*, Baly); antennis quam corporis dimidium vix longioribus, articulo 3° quam 1^us^ haud longiori; prothorace quam longiori plus quam duplo latiori, antice vix sinuatim fortiter emarginato, postice leviter bisinuato, ad latera sat crasse ruguloso, lateribus minus arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus paullo latior-

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ibus, crebre fortiter punctulatis (quam *P. carnosæ*, paullo magis crebre), interstitiis sparsim fortius punctulatis modice elevatis, angulis humeralibus (a latere visis) vix rotundatis deorsum nullo modo productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., $4\frac{4}{5}$ l.; lat., 4 l.

A very distinct species owing to its strongly ovate form recalling to mind the Tenebrionid genus *Byrsax* (figured in Journ. Ent., I., pl. iii., fig. 7).

The absence of a sinuation on the margin of the elytra behind the shoulder is also a notable character.

S. Australia; Yorke's Peninsula.

P. convexa, sp. nov. Fem. Ovata; minus nitida; valde convexa, elytris ante medium (ut *P. consimilis*, Baly) subgibbosis; rufo-testacea; capite prothoraceque ut præcedentis sculpturatis; antennis quam corporis dimidium brevioribus, articulo 3° quam 1^us^ vix longiori; prothorace quam longiori duplo latiori, cetera ut præcedentis; elytris quam latioribus vix longioribus, fere ut *P. reticulatæ*, Marsh., sculpturatis set etiam magis fortiter verrucosis, angulis humeralibus (a latere visis) vix rotundatis, deorsum vix productis; prosterni parte mediana sat lata, longitudinaliter sulcata, sulci fundo longitudinaliter convexo. Long., $5\frac{1}{5}$ l.; lat., 4 l.

With the form and elytral sculpture of *P. reticulata*, Marsh., this species has the prothorax closely and on the disc evenly punctulate with its sides strongly bisinuate, and the elytra subgibbous behind the scutellum as in *P. consimilis*, Baly. The last-named character distinguishes it from all the allied species, with which it is otherwise capable of confusion.

S. Australia; Fowler's Bay.

P. latissima, sp. nov. Mas. Subcircularis; sat nitida; sat convexa; sordide flavescens elytrorum disco infuscato; capite crebre subtilius punctulato, longitudinaliter vix manifeste impresso; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1^us^ vix longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat crebre sat fortiter (ad latera crasse) punctulato, interstitiis sparsim subtilius punctulatis, lateribus sat arcuatis sat fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus multo latioribus, grosse sat crebre punctulatis, interstitiis inæqualiter valde elevato-rugulosis, angulis humeralibus (a latere visis) rotundatis deorsum vix productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., $4\frac{2}{5}$ l.; lat., 4 l.

Remarkable for the extreme coarseness of its elytral sculpture,

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which character suffices alone to separate it from its described allies.

S. Australia.

P. bella, sp. nov. Mas. Sat late ovata; sat nitida; sat convexa; subtus niger, plus minusve flavo-notata; supra flavo-lutea, antennis (basi excepta) nigris, pedibus nigris plus minusve flavo-notatis; capite crebre subtilius punctulato, longitudinaliter parum impresso; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1^{us} paullo longiori; prothorace quam longiori plus quam duplo latiori, antice sinuatim fortiter emarginato, postice obsolete bisinuato, in disco acervatim sat crebre sat fortiter (ad latera crasse) punctulato, interstitiis subtilissime sparsim punctulatis, lateribus modice arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus parum latioribus, fortiter subcrebre (ut *P. porosæ*, Er.) punctulatis, interstitiis sparsim punctulatis antice sat planis apicem versus subverrucosis, angulis humeralibus (a latere visis) minus rotundatis deorsum manifeste productis; prosterni parte mediana modica, longitudinaliter sulcata, sulci fundo postice longitudinaliter convexo. Long., $5\frac{3}{5}$ l.; lat., $4\frac{1}{5}$ l.

This species has much superficial resemblance to *P. porosa*, Er., but differs from it by considerably larger size, flatter elytral interstices (especially in front), &c., and especially by the different shape of the prosternum.

Australia; I have no record of the exact locality.

P. Zietzi, sp. nov. Fem. Sat late ovata; sat nitida; convexa; pallide flavo-testacea, antennis (basi excepta) nigris; capite crebre subtiliter punctulato, longitudinaliter perspicue subtiliter impresso; antennis quam corporis dimidium paullo brevioribus, articulo 3° quam 1^{us} breviori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice leviter bisinuato, in disco acervatim subtilius minus crebre (ad latera sat crasse nec crebre) punctulato, interstitiis subtiliter punctulatis, lateribus sat arcuatis distincte leviter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus vix latioribus, minus crebre minus fortiter fusco-punctulatis, interstitiis leviter inæqualiter convexis, angulis humeralibus (a latere visis) leviter rotundatis deorsum leviter productis; prosterni parte mediana minus lata longitudinaliter sulcata. Long., 4 l.; lat., $3\frac{1}{5}$ l.

This species resembles *P. obsoleta*, Oliv., but differs from it (apart from color) by its somewhat narrower form, its less trans-

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verse prothorax, the finer puncturation and less elevated interstices of its elytra, and the distinct prominence (in a downward direction) of its humeral angles.

S. Australia; taken by Mr. Zietz near Lake Callabonna.

P. intermedia, sp. nov. Fem. Ovata; modice nitida; convexa; testacea, elytris rufescentibus; capite sat crebre sat subtiliter punctulato, longitudinaliter impresso; antennis quam corporis dimidium longioribus, articulo 3° quam 1^us^ multo longiori; prothorace quam longiori paullo magis quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat fortiter minus crebre (ad latera crasse) punctulato, interstitiis sparsim subtilissime punctulatis, lateribus modice arcuatis leviter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus vix longioribus, fortiter minus crebre punctulatis, interstitiis (parte circa scutellum posita excepta) fortiter confertim subseriatim verrucosis, angulis humeralibus (a latere visis) sat rotundatis deorsum manifeste productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., $5\frac{3}{5}$ l; lat. 4 l.

This is a remarkable species, linking Dr. Chapuis' first group of *Paropsis* to his fourth group. The sculpture of its elytra is almost exactly as in *P. aspera*, Chp. (of the fourth group), excepting in the verrucæ of the alternate interstices not being markedly different from those of the other interstices, and the seriate arrangement of the verrucæ being less regular. The disposition of the sculpture cannot without qualification be called either "confused" or "seriate," but I think the bisinuation of the sides of the prothorax should settle the doubt in favor of the first group. The puncturation of the elytra is almost invisible except near the scutellum, being buried in the deep interstices of the verrucæ.

N.S. Wales.

CANDEZEA.

C. Leai, sp. nov. Oblonga; rufo-testacea, antennis (basi excepta) et elytrorum macula magna mox ante apicem posita nigropiceis, tarsis plus minusve infuscatis; antennarum articulo basali quam 4^us^ vix breviori 3° quam 2^us^ vix longiori; capite prothorace que vix manifeste, elytris crebre subtiliter, punctulatis; corpore subtus parce pubescenti; epipleuris postice anguste fere ad apicem continuatis. Long. 2 l.; lat., $\frac{9}{10}$ l.

This species is easily recognisable by its color and markings, but I have some hesitation in referring it to *Candezea*. Dr. Baly (Jour. Linn. Soc. xx.) thinks that the prolongation of the elytral epipleuræ is not inconsistent with *Monolepta*. Jacoby (Ann. Mus. Genov. 1886, p. 116), on the contrary, argues that all the so-called *Monolepta* having the epipleuræ prolonged should be

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removed from the genus. Following Jacoby I have referred the present insect to *Candezea* on account of its epipleuræ being very manifestly (not excessively narrowly) continued nearly to the apex of the elytra, but a casual glance would unhesitatingly place it in *Monolepta* of which it has entirely the facies. The blackish spot occupies nearly the entire apical-half of each elytron, scarcely reaching the suture, being very distinctly separated from the lateral margin and divided from the apex by a space nearly equal to a quarter of its own length. The anterior coxæ are quite closed posteriorly.

N.S. Wales; taken by Mr. Lea.

COCCINELLIDÆ.

CŒLOPHORA.

C. gratiosa, Muls. Mr. Kœbele has sent me a remarkable series of specimens which must, I think, be attributed to this species. He writes that he is confident they must all be regarded as conspecific, nearly all having been bred from one batch of similar pupæ found on a single orange tree. I am disposed to think he is right, although if it be so *C. gratiosa* is one of the most variable of the *Coccinellidæ*. I can find no characters to distribute the examples before me, except in respect of color and markings, but these vary to an almost incredible extent, scarcely any two of them being alike. One specimen among them agrees very well with the description of *C. gratiosa* except in most of the yellow portions being of a *pale* (almost *whitish*) yellow color, but in other specimens (which, however, vary in other respects from the description) of the series the yellow color is as Mulsant characterises it. The following is a description of the markings on the example that I regard as almost typical:—Head bright yellow with a continuous black border along the front of the clypeus and running back on either side so as to touch the post-ocular sinuosity to the middle of the lateral edge, the hinder half of the lateral edge and the whole of the base being black [there is a narrow yellow line along the front of the prothorax not mentioned in the description, but this is wanting in others of the series]; scutellum black; elytra whitish-yellow with all their margins narrowly black and a very wide black fascia occupying nearly the middle half of their length, this fascia being angularly produced on its front margin on the disc of each elytron and on its hindmargin correspondingly emarginate, the sutural black border being dilated from the scutellum to the fascia in such manner as to present the appearance of a triangle whose apex touches the scutellum while its base is merged in the fascia.

Regarding the specimen I have described as the type, the next

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example (var. A) varies in there being two large yellowish-white spots in the fascia on each elytron, but otherwise is identical. Var. B is identical with var. A, except in the angular projection of the fascia on the disc of each elytron being continued forward to the base of the elytron (so that this var. may be regarded as having black elytra, each bearing five large whitish-yellow spots). Var. C differs from B only in the yellow coloring being very much brighter, and the yellow front margin of the prothorax being absent. Var. D is best compared with B, from which it differs in the front margin of the prothorax being *widely* yellow, while there are two yellow spots on the disc near the base, and in the great diminution of black marking on the elytra, the lateral black border having disappeared and the other black markings being represented by markings of similar form, but of a pale brown color, which here and there, however, deepen into black. Var. E seems to be a development of D, having the discal black of the prothorax not only edged in front, but also traversed near the base by yellow, and having the elytra entirely edged with black, as in C, but with the black fascia transformed into an ill-defined pale-red blotch, roughly resembling the fascia in the typical form (but with its anterior extension mnch as in B and C), yet not reaching the lateral margin. [Without the intermediate forms var. E could certainly not be connected with the type]. Var. F. resembles E except in the anterior extension of the elytral fascia being absent. Var. G. is entirely of a yellowish-testaceous color except the lateral margin of the prothorax in its hinder part, the scutellum, and all the elytral edges are black. (*C. versipellis*, Muls., is extremely like this var., but is much larger and I think distinct.) Var. H is like G, but with the elytra opaque owing to close asperate puncturation; a singular variation, which I have observed in several of the Australian *Coccinellidæ*. In all these specimens the undersurface, legs, and antennæ agree with Mulsant's description of the type. M. Mulsant unites *C. gratiosa* with *patruelis* in his Monograph of the *Coccinellidæ* (p. 276) and I should think it not unlikely he may be right in doing so, although Mr. Crotch in his "Revision" seems to regard them as distinct. I have not seen a specimen, however, that agrees with M. Mulsant's description of *C. patruelis* and therefore am not in a position to express a decided opinion on the point.

C. veranioides, sp. nov. Ochracea; prothorace nigronotato; elytrorum marginibus (basali excepto) omnibus et vitta discoidali (hac nec basin nec apicem attingenti in medio constricta vel interrupta), corpore subtus (abdominis lateribus exceptis), pedibusque (tibiis anticis tarsisque omnibus exceptis) nigris; prothorace elytrisque subtiliter minus

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crebre punctulatis; prosterno bicarinato; metasterno antice truncato; abdominis laminis nec apicem nec marginem lateralem segmenti attingentibus. Long., $1\frac{3}{4}$—$2\frac{1}{5}$ l.; lat., $1\frac{1}{2}$—$1\frac{4}{5}$ l.

The black marks on the prothorax are a basal fascia, the front margin of which is sinuous, and there are two discal spots immediately in front of the basal fascia (in some examples joined to it). The black lateral margin of the elytra is dilated in the middle; the sutural black margin is more or less dilated a little before the apex. This species is apparently near to *C. Ripponi*, Crotch, but differs in being much smaller, with the discoidal vitta of the elytra not reaching the base, and constricted in the middle (interrupted in some examples). I should suppose it to be possibly a var. of *Ripponi*, were it not that Mr. Crotch expressly states that in that species the abdominal lamella reaches the lateral margin of the segment.

N.S.W.; taken by Mr. Koebele on Harwood Island.

ORCUS.

O. nummularis, Boisd. Mr. Koebele informs me that this is certainly a good species and that its larva is quite different from that of *O. Australasiæ*, Boisd., of which insect it has been considered a variety.

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ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1893-94.

ORDINARY MEETING, NOVEMBER 7, 1893.

Prof. R. TATE (President) in the chair.

BALLOT.—AUGUSTUS SIMSON, of Hobart, Tasmania, was elected a Fellow.

EXHIBITS.—Prof. R. TATE exhibited specimens of ochres interstratified between archæan quartzites on the coast cliffs near the Gorge of Pedler's Creek, Noarlunga, which may possibly be the residual products from the decomposition of volcanic ash. If such should be the case, it would prove them to be the oldest volcanic rocks in Australia. J. G. O. TEPPER, F.L.S., showed some new cockroaches from Northern Queensland and the Northern Territory.

PAPER.—"The Anthropology of the Elder Exploring Expedition," by RICHARD HELMS.

ORDINARY MEETING, DECEMBER 5, 1893.

Prof. R. TATE (President) in the chair.

EXHIBITS.—S. DIXON exhibited minerals illustrative of the gold-bearing rocks of the Murchison Goldfields, W.A. The reefs occurred either in diorite or granite. In the former the quartz was dark; in the latter, white. The gold-bearing area appeared to be of wider extent than in any other part of the world. In connection with the reefs, a moderate supply of fresh water was generally found from 80 to 100 feet; deeper the water became salt. J. G. O. TEPPER, F.L.S., exhibited the colored leaf of *Pancratium rotatum* and a diseased leaflet of *Ceratonia siliqua*, which had been reported upon by Mr. D. MCALPINE. The former he considered due to climatic conditions; the latter to the ravages of the pear-mite, *Phytoptus pyri*.

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PAPERS.—"Origin and Nature of the Volcanic Bombs of Central Australia," by Prof. STELZNER; and "Notes on *Orthoceras strictum*," by J. G. O. Tepper, F.L.S., who characterised one of its varieties, and proposed for it the name of *O. succulenta*.

ORDINARY MEETING, MARCH 6, 1894.

MAURICE HOLTZE (Vice-President) in the chair.

ELECTION OF AUDITOR.—Mr. D. J. ADCOCK was elected the Auditor for the current year.

EXHIBITS.—OSWALD LOWER, F. Ent. S., exhibited a portion of his large collection of Queensland Lepidoptera recently collected. J. G. O. TEPPER, F.L.S., showed some galls forwarded by Mr. F. M. Bailey (Gov. Botanist of Queensland) from Taylor's Range, near Brisbane.

PAPERS.—"Supplementary and Additional Descriptions of the *Blattariæ* of Australia and Polynesia," by J. G. O. TEPPER, F.L.S. "Descriptions of *Microlepidoptera* from Moreton Bay, Queensland," by A. JEFFERIS TURNER, M.D. "Descriptions of the Larvæ of some S.A. Lepidoptera," by E. GUEST.

ORDINARY MEETING, APRIL 3, 1894.

Prof. R. TATE (President) in the chair.

BALLOT.—JAMES A. KERSHAW, Entomologist National Museum, Melbourne, and A. JEFFERIS TURNER, M.D., Brisbane, were elected Fellows.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited a large slab of polished Cambrian limestone from twelve miles north of Blinman, forwarded by Mr. Parkes, Inspector of Mines. It consisted of an antique type of coral. He also showed a new foraminifer from Muddy Creek, Victoria, named by M. Schlumberger, of Paris, *Trillina Howchini*. WALTER GILL, F.L.S., Conservator of Forests, laid on the table a fine sample of dates grown at Hergott. Prof. TATE, F.G.S., exhibited the casts of three pleiosaurian vertebræ from the Lake Eyre Basin; also a Jurassic Pecten from Western Australia; also glaciated stones from Bacchus Marsh, Victoria, forwarded by Mr. Sweet. W. B. POOLE demonstrated under the microscope the fungoid character of some discolorations on a leaf of *Pancratium rotatum*.

PAPERS.—"Notes on a New Classification of *Brachyscelid Galls*," by W. W. FROGGART. "Flora of Leigh's Creek Formation," by G. SWEET, F.G.S.

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ORDINARY MEETING, MAY 1, 1894.

Prof. R. TATE (President) in the chair.

EXHIBITS.—W. HOWCHIN, F.G.S., laid on the table a collection of native stone implements collected at McDonnell Bay, S.A. J. G. O. TEPPER, F.L.S., exhibited a fungus obtained by Mr. A. Molineux in the mallee scrub of Victoria near the S.A. boundary. It apparently belonged to the genus *Strombilomyces*. It was remarkable for having a large conical base largely made up of mineral matter. The stem and pileus were of a woody hardness. Also specimens of *Pyrameis cardui* from Europe, India, California, and South Australia, which were almost identical in appearance. W. H. SELWAY showed a specimen of *Alectoria superba* (Brunner) from the Far North of South Australia. This was the third specimen collected in South Australia.

PAPERS.—"Remarks on S.A. *Rhopalocera*," by OSWALD LOWER, F. Ent. S. "New Australian *Heterocera*," by OSWALD LOWER, F. Ent. S. "Descriptions of New Coleoptera," by Rev. THOMAS BLACKBURN, B.A. "The Myology of *Notoryctes*, with Comparative Notes," by Prof. WILSON, M.D. "Supplementary Note on the Osteology of *Notoryctes*," by E. L. STIRLING, M.D., F.R.S. "On the Occurrence of the Fissurellid genus *Zidora* in Australian Waters," by Prof. R. TATE.

ORDINARY MEETING, JUNE 5, 1894.

Rev. THOMAS BLACKBURN, B.A. (Vice-President), in the chair.

EXHIBITS.—D. J. ADCOCK exhibited fossils and casts of large species of *Turbo*, *Trochus*, *Voluta*, *Conus*, and, probably, *Natica*, from a limestone formation at Tickera Bay, Yorke Peninsula. J. G. O. TEPPER, F.L.S., showed specimens of a primary rock formation on the Lower Sturt River to the east of the South Road.

PAPERS.—"Classification of Igneous Rocks," by CHARLES CHEWINGS, Ph. D. "Notes on the Sedimentary Rocks in the McDonnell and James Ranges," by CHARLES CHEWINGS, Ph. D.

ORDINARY MEETING, JULY 3, 1894.

MAURICE HOLTZE, F.L.S. (Vice-President), in the chair.

EXHIBITS.—CHARLES CHEWINGS, Ph. D., exhibited rock specimens from Toy's Reef, Mount Pleasant. He stated that the dyke belonged to the pegmatitic series of dyke formations, not having the structure of an injected plastic mass of granite. Some

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of the granite had a distinctly "graphic" arrangement. He considered the structure as favorable for the occurrence of rare and valuable minerals. He thought that the dyke had been formed after the surrounding schists had received their present general disposition, but some movement had transpired since the dyke was formed. J. G. O. TEPPER, F.L.S., exhibited photographs of the fungus exhibited at the May meeting, and which had been named *Laccocephalum basilapiloides* (McAlpine and Tepper). M. HOLTZE, F.L.S., referred to an imported weed, *Stachys arvensis*, which he showed, as being reported to be poisonous to stock.

PAPER.—On the formation of Granite," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, AUGUST 7, 1894.

Rev. THOMAS BLACKBURN, B.A. (Vice-President) in the chair.

EXHIBITS.—CHARLES CHEWINGS, Ph.D., exhibited a collection of Ammonites from various parts of Europe illustrative of the Middle Lias. W. HOWCHIN, F.G.S., showed a specimen of slag from Broken Hill Proprietary Mine resembling Peel's hair, and which was formed whenever the orifice of the vent became blocked. J. G. O. TEPPER, F.L.S., exhibited some foreign *Curculionidæ;* also a specimen of iron ore with cubical faces, supposed to be a pseudomorph of hæmatite; also a sample of linoleum made of cork-dust, and adapted for the use of entomologists.

PAPER.—"*Omalanthus Leschenaultianus* and Red-water in the Northern Territory," by M. HOLTZE, F.L.S.

ORDINARY MEETING, SEPTEMBER 4, 1894.

Prof. RALPH TATE (President) in the chair.

MALCOLOGICAL SECTION.—The PRESIDENT reported that the Council had approved of a new Section of the Society being formed for the special study of molluscan forms of life, to be called the Malacological Section.

EXHIBITS.—Prof. RALPH TATE exhibited a collection of fossils illustrative of the McDonnell Ranges, Central Australia, with explanatory remarks of the general physical and geological features of the country.

PAPER.—"Description of *Hadra Adcockiana*," by W. T. Bednall.

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Annual Meeting, October 2, 1894.

Prof. Ralph Tate (President) in the chair.

Exhibits.—W. Howchin, F.G.S., exhibited a cluster of tabular crystals of barite from Mitcham quarry, Adelaide. J. G. O. Tepper, F.L.S., showed a case of weevils.

Ballot.—Prof. Wilson, M.D., of Sydney University, was elected an Hon. Fellow.

Report.—The Annual Report of the Council and balance-sheet of the Society were read and adopted.

Election of Council.—The Council for the ensuing year was elected as follows:—President, Prof. Tate; Vice-Presidents, Rev. Thos. Blackburn, B.A., and Maurice Holtze, F.L.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretaries, W. L. Cleland, M.B., and W. B. Poole; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., C.M.G., F.R.S., Walter Howchin, F.G.S., Samuel Dixon, J. S. Lloyd, and W. H. Selway.

Election of Auditor.—D. J. Adcock was elected Auditor for the ensuing year.

Votes of Thanks.—A vote of thanks was carried to the Hon. Treasurer, Hon. Secretaries, and Auditor for their services during the past year.

Papers.—"Diagnoses of Central Australian Land Shells," by Prof. R. Tate. "Descriptions of Australian Coleoptera," by Rev. Thos. Blackburn, B.A.

Special Exhibits.—Prof. Tate exhibited new species of Central Australian Flora, with explanatory remarks.

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ANNUAL REPORT.

The Council has to report that the scientific work of the Society has been carried on successfully during the past year. Owing to unavoidable delay in printing the earlier papers read during the past year it was decided to issue the Society's volume in an annual instead of a half-yearly form. The Council regrets to report that owing to circumstances over which it had no control the continuance of the printing of the Elder Exploring Expedition volume has been delayed.

During the past year three new Fellows have been elected, and one Fellow has resigned.

The Council has the melancholy duty of reporting the death of two Fellows—Mr. Gregory Board, Metallurgist Port Pirie Smelting Works, and Rev. W. R. Fletcher, M.A.

The membership of the Society consists at the present time of 11 Hon. Fellows, 75 Fellows, 16 Corresponding Members, and 1 Associate.

Three new exchanges with learned Societies and publishers have been made, namely, the Annuaire Géologique, the Manchester Geological Society, and the Department of Agriculture of Washington, U.S.

At the request of several Fellows interested in the molluscan fauna the Council has favorably considered the application for the formation of a Malacological Section of the Royal Society, South Australia, and granted permission for the same.

During the past year some prominent Fellows of the Society have been closely identified with two scientific undertakings in the colony. The one was the collection and preservation of the diprotodon and other fossil remains from Lake Callabonna, the success of which was largely due to the indefatigable energy and skill of Mr. A. Zietz, the Assistant Director of the Adelaide Museum. The other was the Horn Exploring Expedition, in which both Dr. Stirling, F.R.S., and Prof. Tate, F.L.S., were leading members.

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THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.	Cr.	£	s.	d.	£	s.	d.
Oct. 1, 1893.							By Cost of Transactions—						
To Balance				104	1	2	Printing and Binding (Half-year)	58	6	6			
" Subscriptions—							Illustrating	28	10	0			
Royal Society	64	1	0				Publishing (Half-year)	4	0	0			
Field Naturalists' Section ...	13	10	0								90	16	6
Microscopical Section	2	0	0				" Wages—Caretaker				3	0	0
Astronomical Section	10	17	6				" Printing, Postage, and Stationery ...				5	9	6
				90	8	6	" Advertising				4	16	8
" Grant from Government				92	16	6	" Library—Carriage of Books... ...				0	11	6
" Interest				1	18	9	" Grants—Field Naturalists' Section...	10	0	0			
							Astronomical Section ...	12	0	0			
											22	0	0
							" Shelving				0	8	0
							" Stamp Duty				0	2	6
							Sept. 30, 1894.						
							" Balance—Union Bank	158	13	6			
							Savings Bank	3	6	9			
											162	0	3
				£289	4	11					£289	4	11

Audited and found correct.

D. J. ADCOCK, Auditor.

WALTER RUTT, Treasurer.

October 2, 1894.

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DONATIONS TO THE LIBRARY

For the Year 1893-94.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

ARGENTINE STATES.

Buenos Aires—Boletin de la Academia Nacional de Ciencias, tome XII, 1890.

AUSTRIA AND GERMANY.

Berlin—Verhandlungen Gesellschaft für Erdkunde, band XX., No. 7; XXI., Nos. 1 to 6.

——— Zeitschrift, ditto, band XXVIII., No. 6; XXIX., Nos. 1 and 2.

——— Sitzungsberichte Königlich Preussischen Akademie der Wissenschaften zu Berlin, No. 1 to 25, 1893.

——— Abhandlungen der Königlich Preussischen Meteorologischen Instituts. Ergebnisse Beobachtungen an den Stationen, II. and III. ordnung.

Bonn—Naturhistorischen Vereins der Preussischen—Rheinlande Westfalens und des Reg.-Bezirks Osnabruck, verhandlungen Hälfte, 1893.

Gottingen Nachrichten von der K. Gesellschaft der Weissenschaften u der Georg-August Universitat. Nos. 11 to 14, 1893; 1 to 16, 1892; 1 to 21, 1893; 1 and 2, 1894.

Vienna—Verhandlungen der K. K. Geologischen Reihesanstalt, No. 6 to 10, 1893; 1 to 9, 1894; 1 to 18, 1893.

——— Kaiserliche Akad. der Wissenschaften in Wien, 1894, Nos. 1 to 19.

——— Annalen des K. K. Naturhistorisches Hofmuseum, band VIII., Nos. 3 and 4.

——— Verhandlungen K. K. Zoologisch-Botanischen Gesellschaft in Wien, Band XVIII, Nos. 1 and 2.

Würzburg—Sitzungsberichte der Physikalisch-Medicinischen Gesellschaft, No. 1 to 11, 1893.

CANADA.

Montreal—Canadian Record of Science; vol. V., Nos. 6 and 7.

——— Geological Survey of Canada; Annual Report; vol. V., parts 1 and 2, with maps.

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Toronto—Canadian Institute; Fifth Annual Report, Session 1892-3; Seventh Annual Report, 1894. Transactions, vol. III., part 2; vol. IV., part 1.
Halifax—Proceedings Nova Scotian Institute of Natural Science; vol. I., part 2, second series.

CAPE COLONY.

Cape Town—Transactions Philosophical Society; vol. V., part 2; vol. VII., part 2; vol. XVIII., part 1.

CHILE.

Santiago—Actes de la Société Scientifique; tome III., 1893, and tome IV., 1894.
——— Verhandlungen des Deutschen Wissenschaftlichen Vereins; band II., heft 5 and 6.

FRANCE.

Nantes—Bulletin de la Société des Sciences Naturelles de l'Ouest de la France, tome 3, tome 4, No. 1.
Marseilles—Annales de Faculté des Sciences, tomes I., II., III.
Paris—Feuilles des Jeunes Naturalistes, series III., Nos. 276 to 285, des Sciences Société.
—— Bulletin Entomologique, pp. 1 to 272, 1893; pp. 1 to 13, 1894.
—— Annuaire Geologique Universel, tome IX, parts 1 to 4.

GREAT BRITIAN AND IRELAND.

Belfat—Reports and Proceedings Belfast Natural History and Philosophical Society, session 1892-93.
Dublin—Royal Irish Academy Proceedings, vol. II., Nos. 4 and 5; vol. III., No. 1 and 2.
——— Transactions ditto, vol. XXX., parts 5 to 10.
——— Scientific Proceedings Royal Dublin Society, vol. IV., series 2; vol. V., series 2; vol. VII., part 5; vol. VIII., parts 1 and 2.
Edinburgh—Royal Physical Society, session 1892-3.
——— Royal Society of Edinburgh, vol. XIX., 1891-2.
——— Geological Society Transactions, vol. VI., part 1; roll to March, 1893.
London—Journal Royal Microscopical Society, parts 5 and 6, 1893; parts 1, 2, and 3, 1894.
——— British Museum Catalogue of Birds, vols. 21 and 22.
——— Linnean Society Proceedings, Oct., 1893; May, 1894.
——— Entomological Society Transactions, 1893.
——— Imperial Institute, Annual Report; 1893 Year Book.
——— Proceedings Royal Society, Nos. 326 to 335.
——— Royal Colonial Institute, vol. XXIV., Proceedings.

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London—Natural Science, vol. IV., No. 23.
——— Kew Gardens Bulletin, 1893.
Leeds—Journal of Conchology, vol. VII, Nos. 8 to 11.
Manchester—Journal of the Geographical Society, vol. VIII, Nos. 7 to 12; vol. IX, Nos. 1 to 9.
——— Field Naturalists' and Archæologists' Society Report and Proceedings, 1892.
——— Geological Society, Transactions, 1893-4, vol. XXII., parts 14 to 18.
——— Memoirs and Proceeding Manchester Literary and Philosophical Society, vol. VIII., No. 1 and 2.

INDIA.

Calcutta—Indian Museum, vol. II., No. 7; vol. III., No. 3.

ITALY.

Turin—Bolletino dei Musei di Zoologia ed Anatomia Comparata dello R. Università di Torino, vol. VIII., No. 151 to 154.
Pisa—Atti della Società Toscana di Scienze Naturali, vol. IX., pp. 1 to 61.
Milan—Atti della Società Italiani Scienza Naturali, vol. XXXII., Nos. 1 to 4; vol. XXXIII., Nos. 1 to 3; vol. XXXIV., Nos. 1 to 4.
—— Bulletin Società Entomologica Italiana, parts 1 to 4, 1893; parts 1 and 11, 1894.

JAPAN.

Tokio—Tránsactions Seismological Society, vol. II., 1893.
—— Journal College of Science, Imperial University, vol. VI., parts 3 and 4; vol. III., 1894; vol. VII., part 1.
—— Journal Tokio Geographical Society, 25th year, 1892; 26th year, 1893.

JAVA.

Batavia—Naturkundig Tigdschrift von Nederlandsch-Indie, deel 52 and 53.

MEXICO.

Mexico—Memoirs de la Sociedad Cientifica (Antonio Alzate), tomo VII., Nos. 5 and 6.

NEW SOUTH WALES.

Sydney—Records of the Australian Museum, vol. II., No. 5.
——— Catalogue Australian Birds Report for 1893.
——— Department of Agriculture—Plant Diseases and their Remedies; Annual Report, 1893.

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Sydney—Agricultural Gazette, vol. IV., 9 to 12; vol. V., parts 1 to 8.
——— Proceedings Linnean Society; vol. VIII., parts 2, 3 and 4; vol. IX., part 1.
——— Sydney University Calender, 1894.
——— Royal Society Proceedings; vol. XXVII., 1893.
——— Department of Mines. Records, vol. III., part 4; vol. IV., part 1; Memoirs Geological Survey, N.S.W., No. 5.
——— Sydney Observatory; Rain, River and Evaporation Observations, 1892; Diagram of Isothermal Lines of N.S.W.; Meteorite, No. 2; Pictorial Rain Maps; Moving Anticyclones in Southern Hemisphere; Hailstorms.

NEW ZEALAND.

Wellington — Transactions and Proceedings New Zealand Institute, vol. XXVI.

NORWAY AND SWEDEN.

Stockholm—Geologiska Förening; band XV., 1893.
Christiana—Den Norske Nordhans Expedition 1876-78; XXII., Ophiuriodea.

PORTUGAL.

Porto—Annaes de Sciencias Naturals. First year, No. 1.

QUEENSLAND.

Brisbane—Department of Agriculture, Bulletin, No. VIII., Botany.
——— Geological Survey Office—Reports on Mount Morgan Deposits; Progress Report, 1893; Tawalla and Maruba Goldfields; Ulam Goldfields; Deephead Cape River Goldfields.

RUSSIA.

St. Petersburg—Bulletin du Comité Geologique, vol. XII., No. 3 to 7; Supplement and tome XII.
——— ——— Société Impériale Mineralogique, vol. 30, second series.
Moscow—Bulletin de la Société Impériale des Naturalistes, No. 4 and No. 1.

SWITZERLAND.

Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles; vol. XXIX., No. 112 and 113; vol. XXX., No. 114.

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Geneva—Société de Physique et d'Histoire Naturelle. Compte Rendu des Sciences ; No. X., 1893.

SOUTH AUSTRALIA.

Adelaide—Observatory Meteorological Observations, 1884-85.

TASMANIA.

Hobart—Royal Society of Tasmania ; Papers and Proceedings, 1893.

UNITED STATES.

San Francisco—Proceedings Californian Academy of Sciences, vol. III., part 2 ; Memoirs, vol. II., No. 3, vol. IV. ; Occasional Papers.

———— Zoe, a Biological Journal, vol. II., 1-4.

New York—Transactions New York Academy of Sciences, vol. XII.

———— Annals ditto, vol. VII, Nos. 1 to 5 ; vol. VIII., Nos. 1 to 3.

Philadelphia—Proceedings of Academy Natural Sciences, part I., 1893, January-March.

Cambridge—Bulletin Museum Comparative Zoology at Harvard College, vol. XV., No. 1 ; vol. XVI., No. 13 ; vol. XXIV., No. 6 and 7 ; vol. XXV., No. 1 to 6. Annual Report.

Washington—Bulletin of the U.S. Geological Survey, Nos. 82 to 86 ; Nos. 90 to 96.

———— Eleventh Annual Report, parts 1 and 2.

———— Geology — Eureka District Monographs, vol. XVII. and vol. XVIII.

———— Department of Agriculture — Foods and Food Adulterants, part 8; Report of Statistician, August, 1893, Report of Statistician, September, 1893; Prairie Ground Squirrels of the Mississippi Valley; Annual Report, 1892; Report of Secretary, 1893; Report of Statistician, November, 1893: Report (Crop of the Year); 8th and 9th Annual Reports of Bureau Annual Industry; Report of the Statistician, No. 112.

———— Smithsonian Institution ; Annual Report Smithsonian, 1890 ; Proceedings United States Natural Museum, vol. XIV. ; Bulletin, No. 40 ; Monographs for Collectors, 7 numbers, viz., Birds, Molluscs, Reptiles, Birds' Eggs, Rough Skeleton Fossils, Preserving Insects ; Monograph N. American Prototrypidæ ; Cata-

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logue Lepidoptera and Myriapoda of N. America; Proceedings, vol. XV., 1892; Bibliography, Chinookan Languages; Eighth Annual Report, No. 43, W.S. West Museum.

Cambridge—Psyche—Journal of Entomology, vol. VI., Nos. 209 to 221.

———— Journal New York Microscopical Society, vol. IX., No. 4; vol. X., Nos. 1 to 3.

Boston—Proceedings American Academy Art and Science, vol. XIX, 1891-92.

Baltimore—John Hopkins' University Circulars, vol. XIII., No. 111 to 114.

Texas—Academy of Science Transactions, vol. I., No. 2.

Salem—Essex Institute Bulletin, vol. 23, No. 1 to 12; vol. 24, No. 1 to 12.

Sacramento—California State Mining Bureau—Methods of Mine Timbering.

Meriden—Transactions of the Meriden Scientific Association—Annual Address.

Rochester—New York Rochester Academy of Science, vol. II., pp. 113 to 200.

Cincinnati—Journal of Cincinnati Society of Natural History, vol. XVI., No. 1.

St. Louis—Missouri Botanic Gardens Report, 1893.

———— Transactions of the Academy of Sciences of St. Louis, vol. VI., Nos. 2 to 8.

Kansas—Academy of Sciences, vol. XIII., 1891, 1892.

Berkly, California—Bulletin Department of Geology, viz.:—
Post Pliocene Diastoophism of Coast of South California.

———————— Eruptive Rocks of Point Bonith.

———————— Geology of Carmelo Bay.

———————— Soda-Ryolite North of Berkly.

Massachussetts—Tuft's College Studies, No. 1 of 1894.

VICTORIA.

Melbourne—Victorian Naturalist, vol. X., Nos. 6 to 12; vol. XI., Nos. 1 to 5.

———— Transactions Royal Geographical Society of Australia (Victorian Branch), vol. XI.

———— Proceedings; Royal Society of Victoria, vol. VI., new series.

Ballarat—School of Mines' Calendar, 1894; Report, 1893.

Geelong—Gorden Technical College; vol. III., No. 4.

The collected papers of Sir W. Bowman, Bart., by Harriet Lady Bowman.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1894.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, N.S.W.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, N.S.W., Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Australia.
1889. *MACGILLIVRAY, P. H., M.R.C.S., F.L.S., Bendigo, Victoria.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Curator Technological Museum, Sydney, New South Wales.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS.
1883. *STIRLING, JAMES, F.L.S., Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

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FELLOWS.

1887. Adcock, D. J., Adelaide, S.A.
1874. Angas, J. H., Adelaide.
1887. Bagot, John, Adelaide, S.A.
1893. *Bednall, W. T., Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. *Bragg, W. H., M.A., Professor of Mathematics, University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., Eng., Kooringa.
1884. Bussell, J. W., F.R.M.S., North Adelaide, S.A.
1891. Calvert, A. F., Adelaide, S.A.
1888. Chapman, R. W.. M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1893. Dudley, U., Broken Hill, N.S.W.
1890. *East, J. J., F.G.S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1882. Fowler, William, Melton. Y.P., S.A.
1889. Fraser, J. C., Adelaide, S.A.
1891. Gill, Walter, F.L.S., Conservator of Forests, South Australia, Adelaide.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, Adelaide.
1890. Gray, Rev. William, Tanna, New Hebrides.
1887. Grasby, W. C., F.L.S., Agricultural College, Roseworthy, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.
1883. Hughes, H. White, Booyoolie, S.A.
1893. James, Thos., M.R.C.S., Eng., Moonta.
1891. Johnson, J., M.D., F.R.C.S., Medical Officer, Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) Kay, Robert, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1866. Lloyd, J. S., Adelaide, S.A.
1888. *Lower, O. B., F.Ent.S., Parkside, Unley, S.A.
1885. *Lucas, R. B., Adelaide, S.A.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, S.A.
1853. Mayo, George, F.R.C.S., Adelaide, S.A.

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1874. MAYO, G. G., C.E., Adelaide, S.A.
1882. *MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1888. MOLINEUX, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) MURRAY, DAVID, Adelaide, S.A.
1884. MUNTON, H. S., Brighton, S.A.
1893. PERKS, R. H., M.D., F.R.C.S., Eng., Medical Superintendent Adelaide Hospital, S.A.
1883. PHILLIPS, W. H., Adelaide, S.A.
1886. POOLE, W. B., Adelaide, S.A.
1882. ROBERTSON, R., F.F.P.S., Adelaide, S.A.
1885. *RENNIE, H. E., M.A., D.Sc., F.C.S., Professor Chemistry University of Adelaide.
1891. ROGERS, R. S., M.D., Adelaide, S.A.
1876. *RUTT, WALTER, C.E., Adelaide, S.A.
1891. SELWAY, W. H., JUN., Adelaide, S.A.
1886. SCOTT, JAMES L., Hyde Park, S.A.
1893. SIMSON, AUGUSTUS, Hobart, Tasmania.
1857, SMEATON, THOMAS D., Blakiston, Little Hampton, S.A.
1871. SMITH, ROBERT BARR, Adelaide, S.A.
1882. SMYTHE, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *STIRLING, EDWARD C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1893. *STREICH, VICTOR, F.G.S., Adelaide, S.A.
1876. *TATE, RALPH, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *TEPPER, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. TODD, SIR CHARLES, K.C.M.G., M.A., F.R.S., F.R.A.S., Government Astronomer, Postmaster-General, and Superintendent of Telegraphs, S.A.
1894. *TURNER, A. JEFFERIS, M.D., Brisbane.
1889. VARDON, JOSEPH, J.P., Adelaide, S.A.
1878. *VERCO, JOSEPH C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. WAINWRIGHT, E. H., B.Sc., St. Peter's College, S.A.
1878. WARE, W. L., Adelaide, S.A.
1879. WAY, EDWARD W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1859. WAY, SAMUEL J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *WHITTELL, HORATIO, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. WILSON, JOHN, F.E.T.S., Goodwood, S.A.
1886. *ZIETZ, A., F.L.S., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1893. BIRKS, LAURENCE, Adelaide, S.A.

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FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee have pleasure in presenting their eleventh annual report, being for the year ending 30th September, 1894.

Evening Meetings.—Eight evening meetings have been held, at which the average attendance was again greater than in the previous year. Owing to the gatherings in connection with the Science Congress in October of last year, the annual conversazione, which is usually held in that month, was omitted. Last winter the meetings of the Field Naturalists' and the Microscopical Sections were held conjointly, but this session, owing to the latter discontinuing to meet, we have not had the advantage of their co-operation. However, the microscopical interest has not been overlooked, as the secretary of that section is now on our Committee, and papers dealing with subjects in microscopy have been read at our meetings. The subjects of the papers read have covered a very wide area in Natural History, such varied topics as birds, stone implements, fishes, pearls, the Antarctic Continent, the Australian Alps, a new rotifer, and the odontophores of gasteropods having been brought before the members. Papers have been contributed by the following gentlemen:—Dr. R. T. Wylde, Messrs. W. Howchin, F.G.S., J. G. O. Tepper, F.L.S., E Ashby, W. H. Selway, jun., W. B. Poole, A. F. Calvert, M.E and J. W. Bussell, F.R.M.S. The exhibits still form an important feature of these meetings, and some very interesting specimens have been shown.

Excursions.—Seven excursions have been held, the attendance at which has been very satisfactory. Nearly all the excursions have been to fresh localities, the most noteworthy being those to Happy Valley, Woodhouse (Stirling East), the River Sturt (from Darlington), and the top of the range from Tea Tree Gully to Anstey's Hill. A dredging trip was arranged for, but not sufficient response was made to justify its being held. At the excursion to Happy Valley the rare orchid, Orthoceras

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strictum, was gathered for the first time at these outings, while at the trip to the River Sturt some interesting geological features were noticed, and on the same occasion a group of nests of the Fairy Swallow (Lagenoplastes ariel) was observed.

Corresponding Members.—Your Committee regret that they have not heard much from corresponding members during the year. From the situation of these members in remote places, it is thought that many specimens new to those living in the capital might be obtained, as well as observations on local fauna and flora. Amongst the specimens received from corresponding members, was the very rare locust, Alectoria superba, sent by Mr. W. E. Rumball, of Blinman. A large and interesting collection from another resident in the far north (Mr. J. R. Mack), included some of the "barking" or "whistling" spiders, to which species reference was subsequently made by members of the Horn Expedition to central Australia on their return to Adelaide.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose will shew what has been done in this direction during the past year.

Death of the Rev. J. McEwin.—Your Committee recorded with much regret the death, during the past year of the Rev. J. McEwin, a foundation member of the Section, a member of the Committee, a contributor to its evening meetings, and a frequent attendant at its excursions.

Resignation of the Hon. Treasurer.—Mr. S. Smeaton, B.A., who was appointed the Hon Treasurer of the Section at the last Annual Meeting, resigned that position a few months later owing to his removal to Western Australia; since then his duties have been performed by the Hon. Secretary.

Proceedings.—No proceedings for 1892-3 have yet been printed, it being the attention, chiefly on the ground of economy, to issue two years' transactions together.

Financial.—From the audited statement of accounts presented herewith, it will be seen that the subscriptions more than cover the expenditure. The latter, owing to the conversazione not being held, and the proceedings not being printed, has been lower than for several years past. The call on the parent Society in the way of grants has been correspondingly reduced.

Membership.—There has been several new members enrolled during the year, while a few names have been removed. The number now on the roll is 90.

ROBERT H. PERKS, Chairman.
W. H. SELWAY, JUN., Hon. Secretary.

Adelaide, 18th September, 1894.

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SIXTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their sixth annual report, the Committee have to chronicle a year in which not much of note has taken place.

Game Laws.—The usual steps have been taken to secure the enforcement of the Game Laws, and the Commissioner of Crown Lands and the police officials merit the thanks of the Committee for the action that they have taken. Various pleasing evidences of the fact that the close seasons are much more strictly observed than in former years have come under our notice.

Amendment of the Game Laws.—The Bill drafted by the Committee amending and consolidating the Game Laws passed the Upper House last season, but lapsed in the House of Assembly. It has not seemed to be opportune to the Committee to press for any further alteration in the Game Acts this session.

Reserves.—The Australasian Association for the Advancement of Science have urged the Government to dedicate the lighthouse reserve at the western end of Kangaroo Island for the preservation of native fauna. The Committee consider that for the present the lighthouse keepers should be asked to pay special attention to the protection of indigenous animals in that locality.

In conclusion, the Committee will be pleased at any time to receive suggestions from members as to the best way of achieving their objects.

A. F. Robin, Hon. Sec.

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FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1893-4.

DR. RECEIPTS.	£	s.	d.	CR. DISBURSEMENTS.	£	s.	d.
To Balance brought forward	4	1	4	By Printing	4	11	0
" Grant from Royal Society	10	0	0	" Postages and Sundries	4	2	6
" Subscriptions	13	10	0	" Advertising	2	11	0
				" Attendance	1	0	0
					12	4	6
				" Subscriptions, as per contra, handed over to Royal Society	13	10	0
				" Balance in hand	1	16	10
	£27	11	4		£27	11	4

Audited and found correct.

THOS. EVANS, F.S.A.I.A.,
THOS. FABIAN, } Auditors.

W. H. SELWAY, JUN.,
Hon. Secretary.

Adelaide, 17th September, 1894.

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MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT, 1893-4.

In consequence of the decreasing number of members who took any interest in microscopical work or attended the meetings, a special meeting was called on April 10th to consider the position of the Section, and as to whether the joint meetings with the Field Naturalists' Section should be continued or not. At this meeting there were only four members present, and it was unanimously felt that it was useless to endeavor to continue the existence of the Section. The Secretary therefore, was directed to notify to the Royal Society that the Section was dissolved, and as there would probably be a small balance on hand after payment of all accounts, the Microscopical Magazines on hand were to be bound as far as funds would permit. All property of the Section to be handed over to the Royal Society.

Appended is a statement of receipts and expenditure. After payment of account for binding there would be a balance of 5d. on hand to be paid to the Royal Society.

J. W. Bussell, Hon. Sec.
D. Fleming, Chairman.

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MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDING 30TH SEPTEMBER, 1894.

RECEIPTS.	£	s.	d.
Balance in hand 30th September, 1893	4	14	5
Subscriptions received	2	0	0
Balance due Secretary	0	4	1
	£6	18	6

EXPENDITURE.	£	s.	d.
E. A. Petherick & Co.—Magazines	1	6	6
Baker & Co.—Objectives for Microscope	3	1	0
Attendance	0	7	6
Stationery	0	0	6
Postage of Circulars, &c.	0	3	0
Royal Society, Subscriptions	2	0	0
	£6	18	6

Audited and found correct.

C. C. PRESGRAVE, Auditor.

September 10, 1894.

D. FLEMING, Chairman.

W. J. BUSSELL, Hon. Secretary.

September 2, 1894.

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ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

SECOND ANNUAL REPORT.

In presenting their annual report the Committee are pleased to record that the objects for which the Society was formed are been carried on satisfactorily.

The Section has 39 members on its roll, having gained five new members and lost five by death and removal since last annual meeting.

The attendance at ordinary meetings has not been so large as the Committee would have liked and expected, the average number present being 15, *i.e.*, less than one-half, after allowing for the six members resident in the country.

One of the ordinary meetings was given up to a conversazione at the Observatory, when, by the courtesy of our President and his staff, a pleasant and profitable evening was spent, including a view of celestial objects by the aid of the equatorial telescope.

The papers read and discussed during the season 1893-4 were:—"Captain Weir's Azimuth Chart," by the inventor; "Ether: The Reasons for Believing in its Existence and its Properties," by Mr. C. C. Farr, B.Sc.; "The Habitability of the Planets," by Mr. W. Holden; "Meteors," by Mr. W. Russell; "Astronomical Photography," by Mr. E. P. Sells; besides which, the passing astronomical phenomena have been expatiated upon by our President, the Government Astronomer (Sir C. Todd), and much valuable information afforded to lay members.

The Astronomical Notes begun in July, 1892, have been continued monthly and distributed to every member, and are, the Committee hopes, found to be increasingly interesting.

The Committee would again ask all members to seek to interest others in the objects of the Section as set forth in Rule 2.

Adopted at meeting held Tuesday, 11th September, 1894.

WM. HOLDEN, Vice-President.

W. E. CHEESMAN, Sec. and Treas.

11th September, 1894.

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ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR YEAR ENDING 15TH SEPTEMBER, 1894.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Balance 8th September, 1893	6	2	9	By Printing Monthly Notes	2	8	0
" Grant from Royal Society	12	0	0	" Stationery	0	9	0
" Subscriptions received	6	2	6	" Postage	2	7	6
" Interest—Savings Bank	0	5	7	" Advertisement and Printing	1	0	10
				" Lantern—Sunday-school Union	1	0	0
				" Attendance	0	2	6
					7	7	10
				" Subscriptions Paid to Royal Society	9	0	0
				" Balance in Savings Bank	7	19	3
				" " in Hand	0	3	9
	£24	10	10		£24	10	10

Audited and found correct.

RICH. F. GRIFFITHS, Auditor.

September 10, 1894.

Submitted to the Annual Meeting, held 11th September, 1894.

WM. HOLDEN, Vice-President.

W. N. CHEESMAN, Hon. Sec. and Treasurer.

September 11, 1894.

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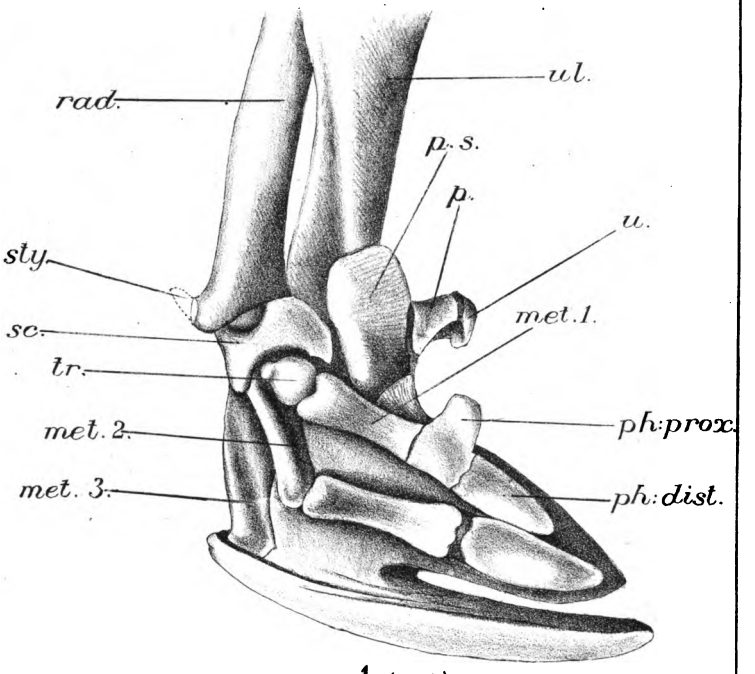

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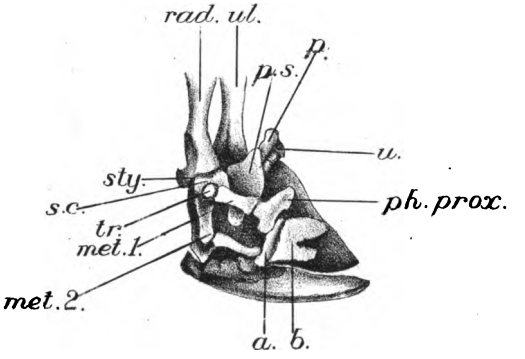

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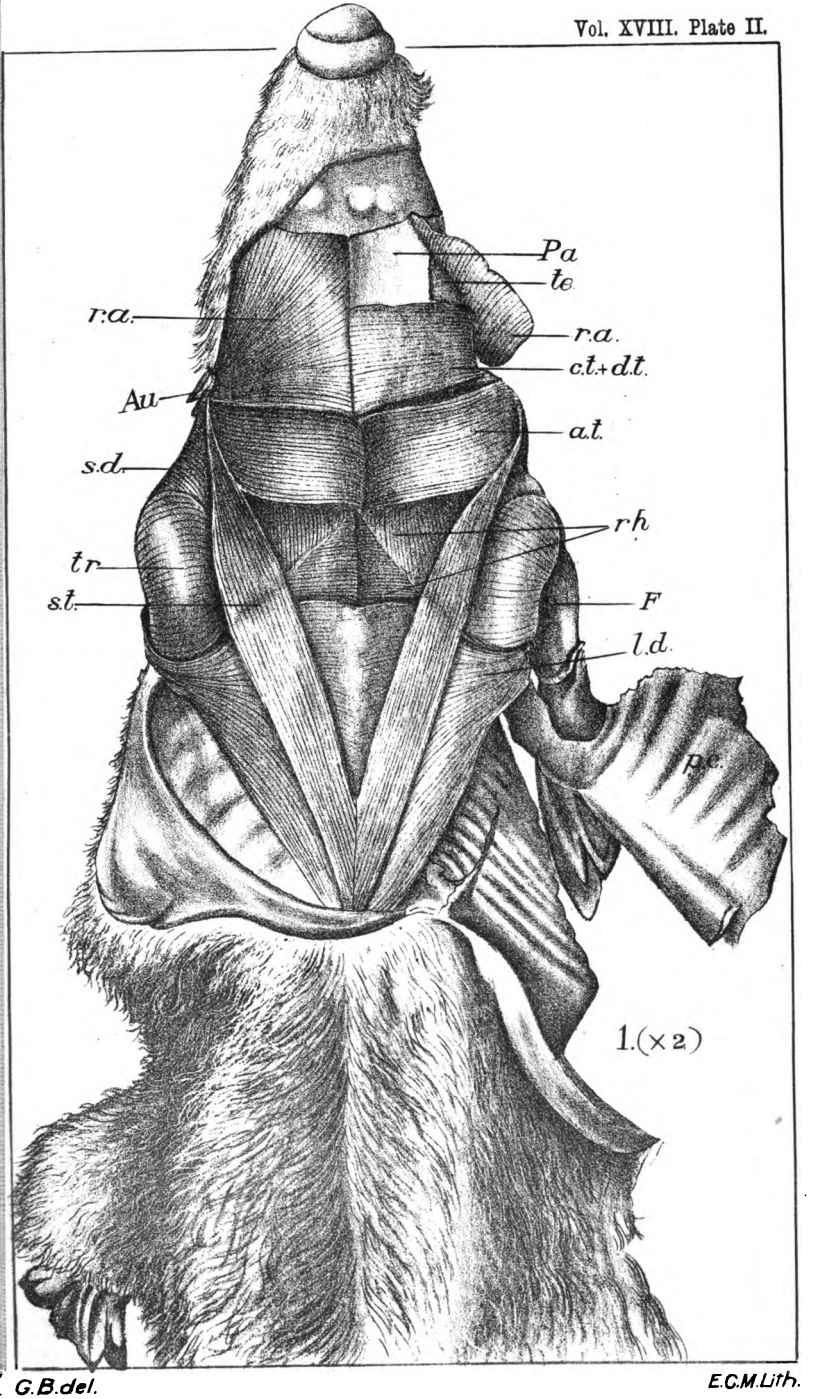

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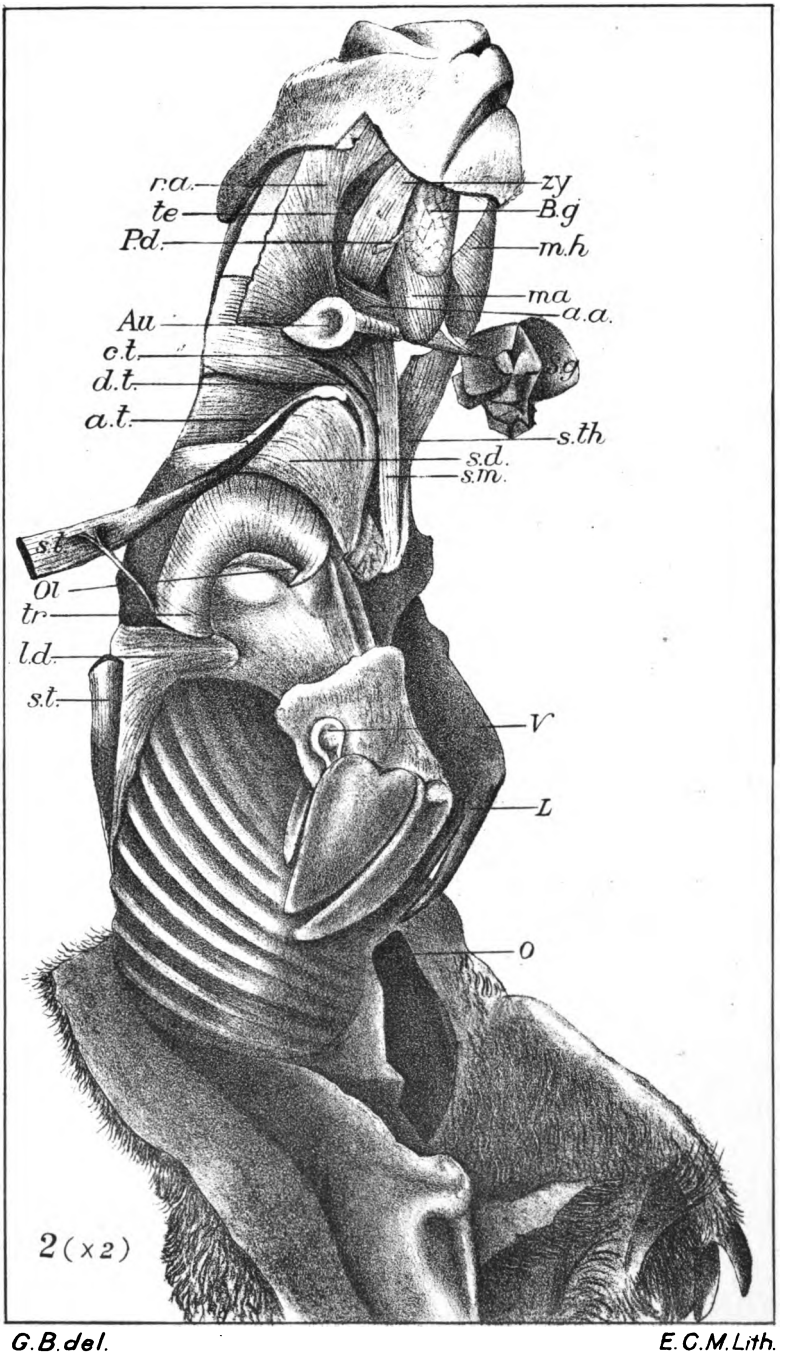

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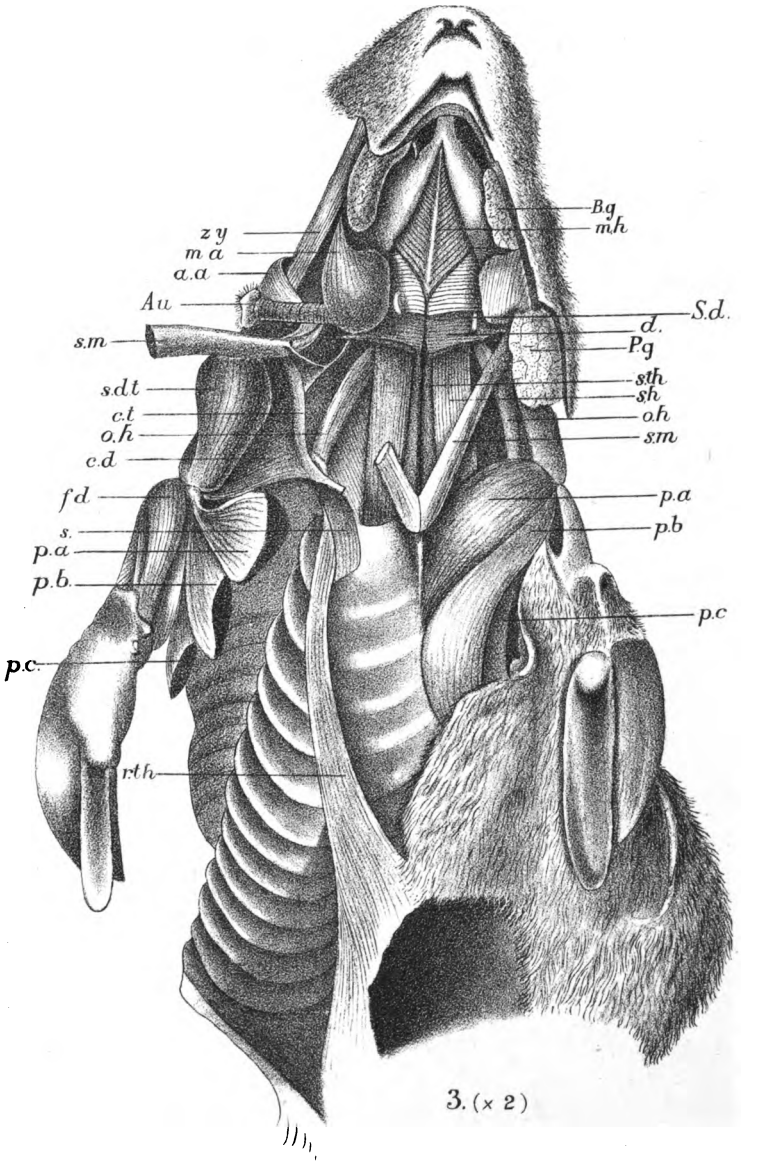

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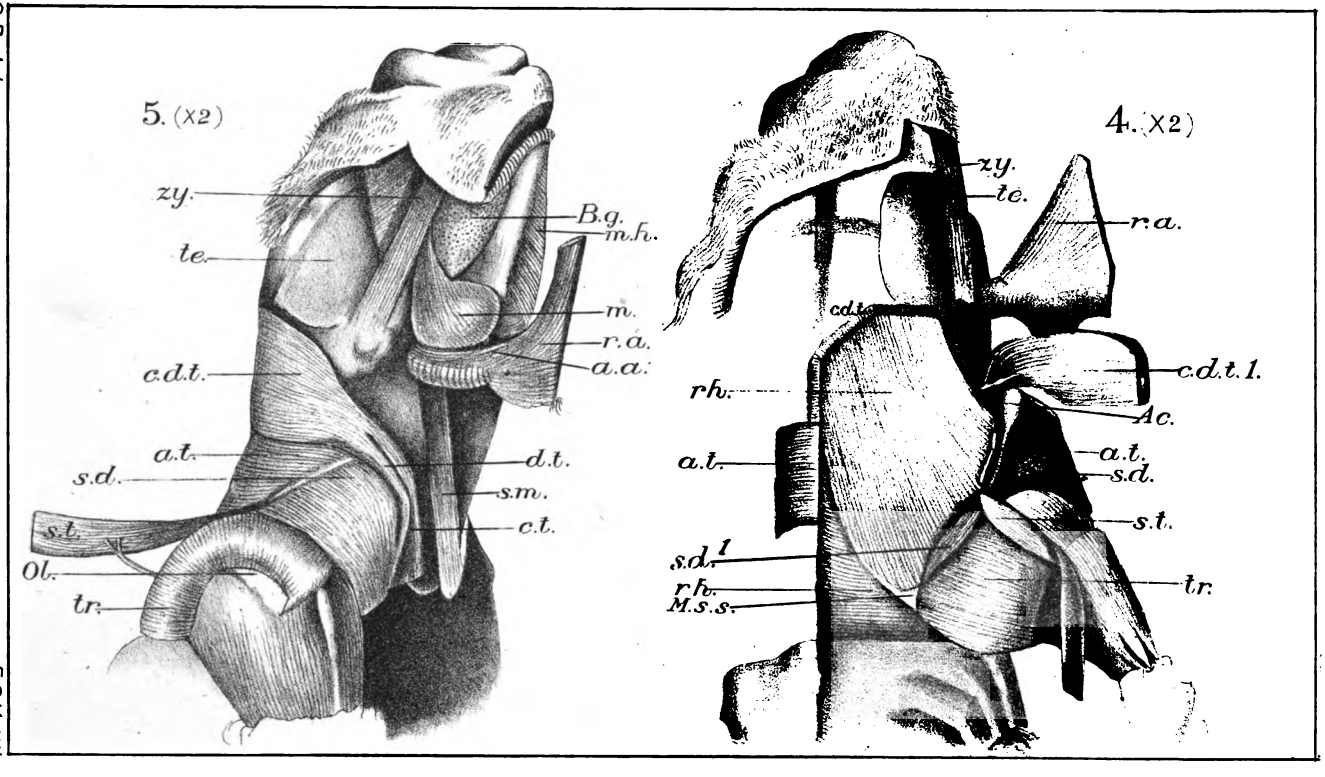

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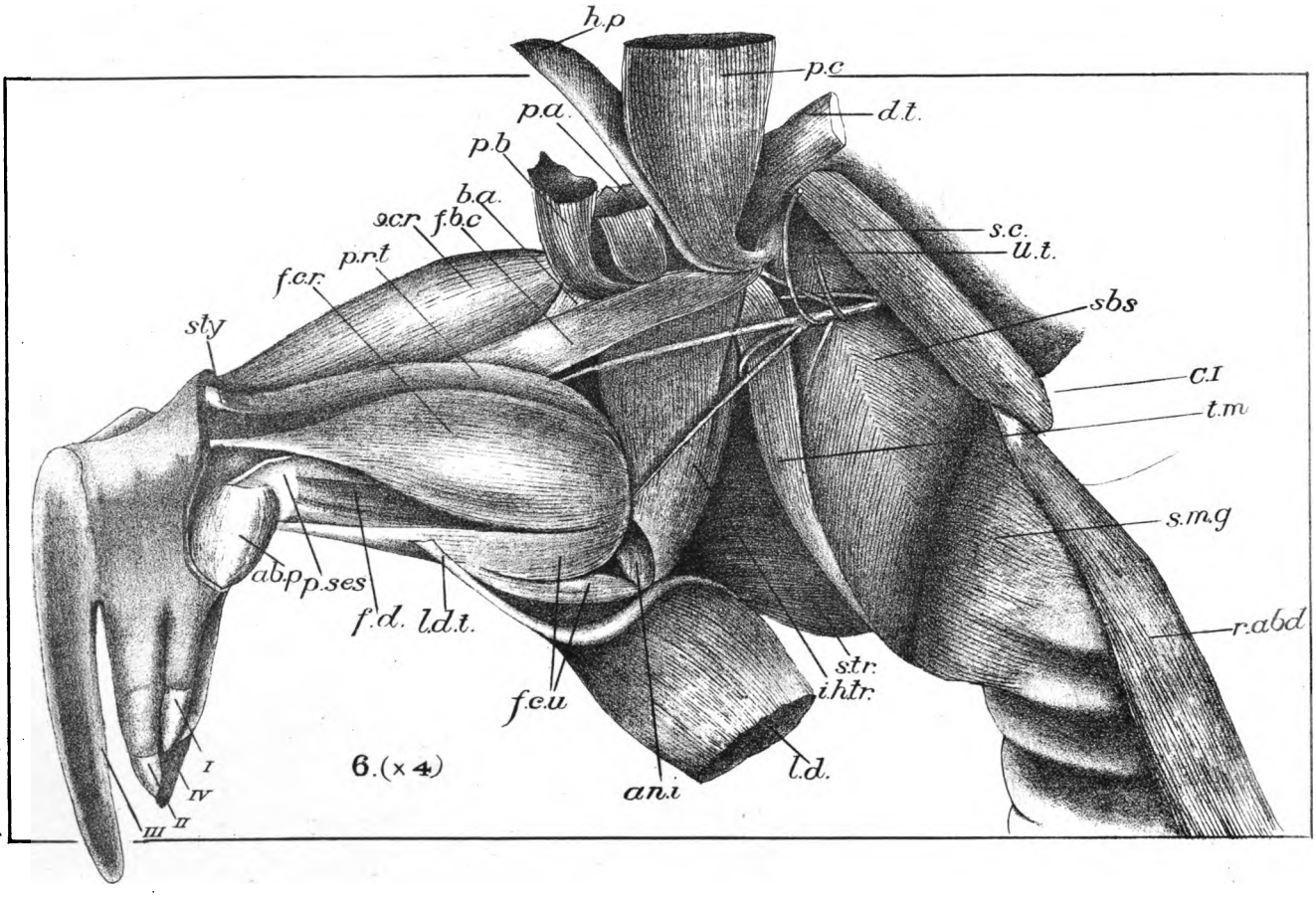

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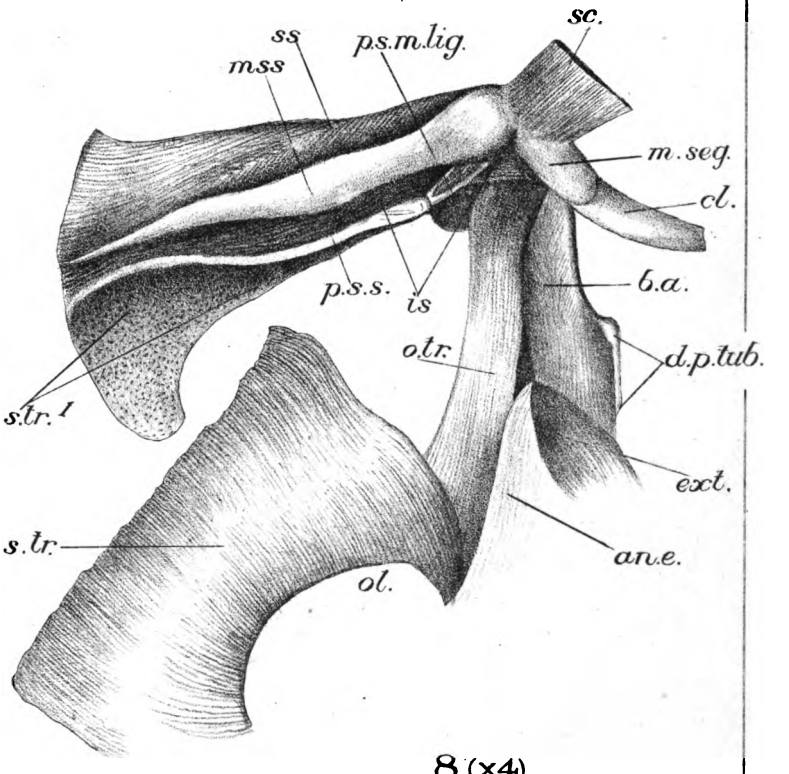

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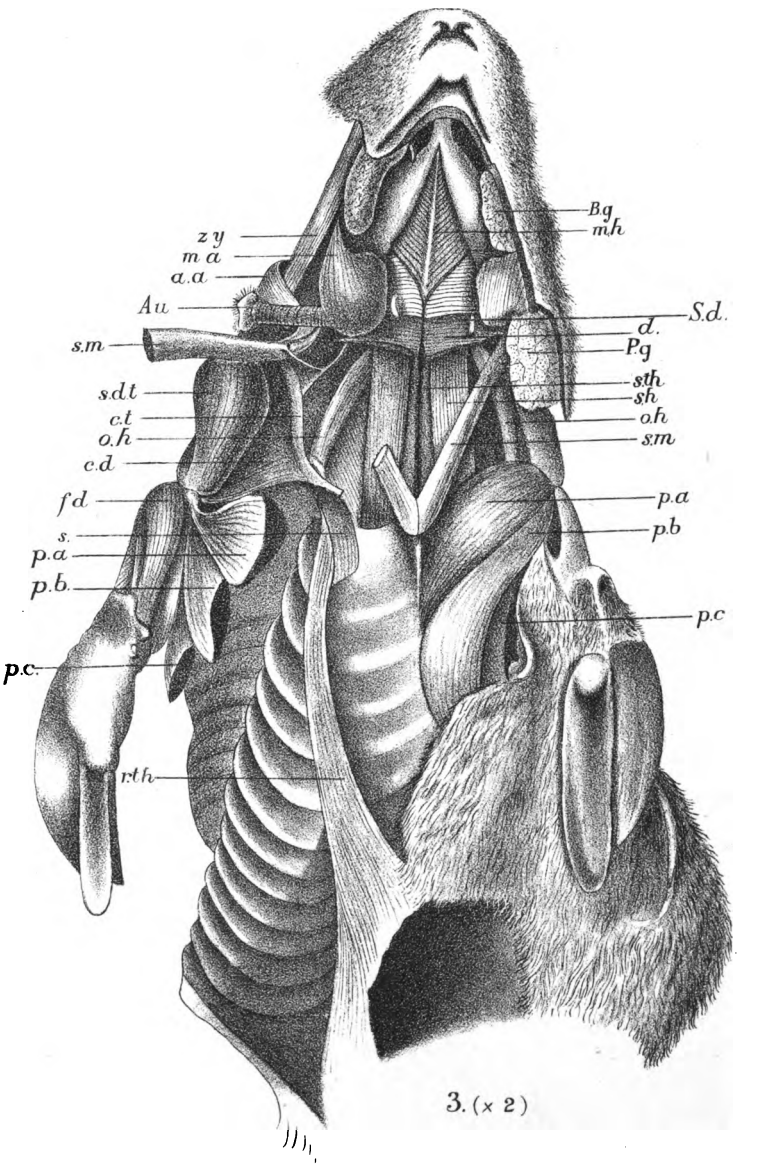

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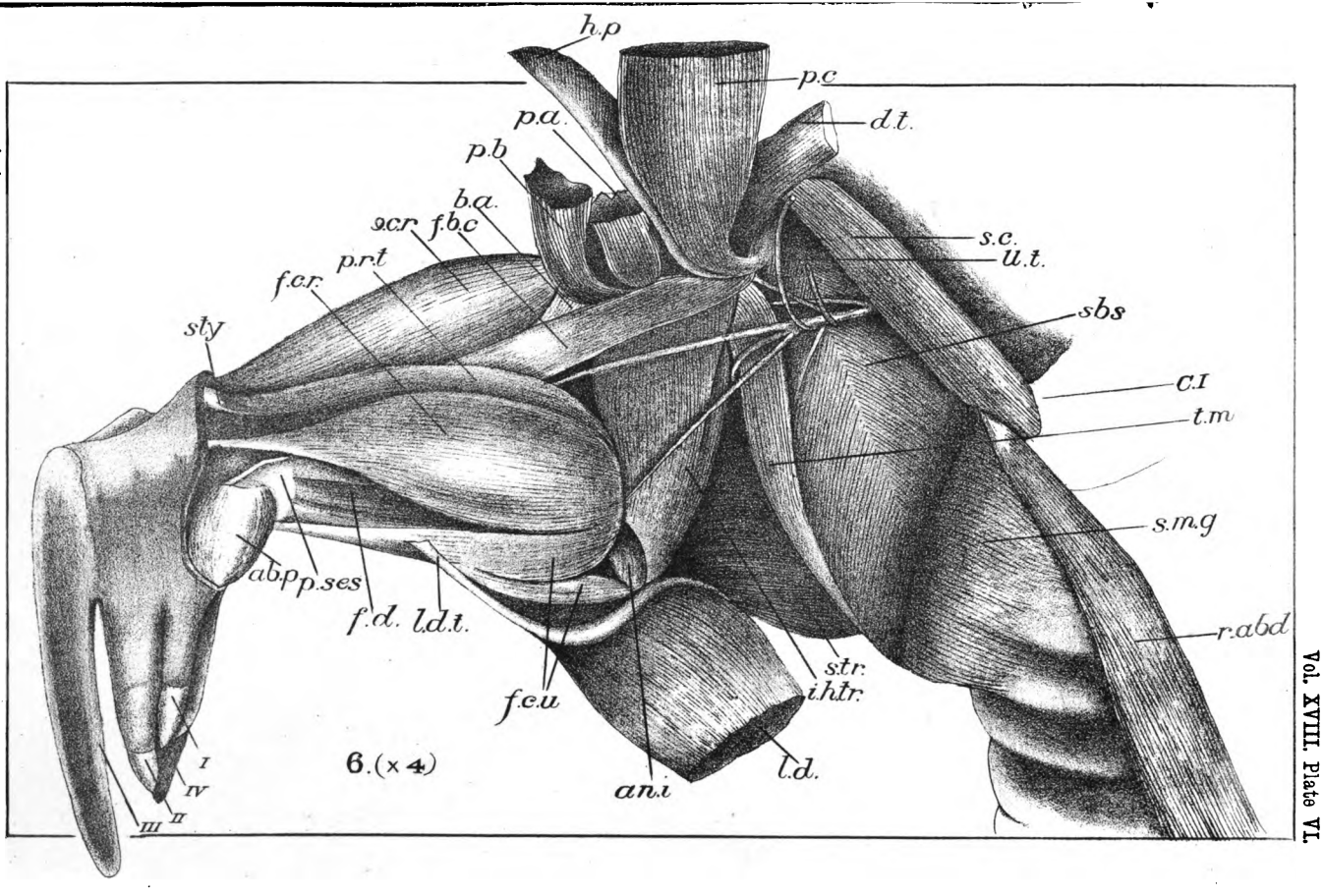

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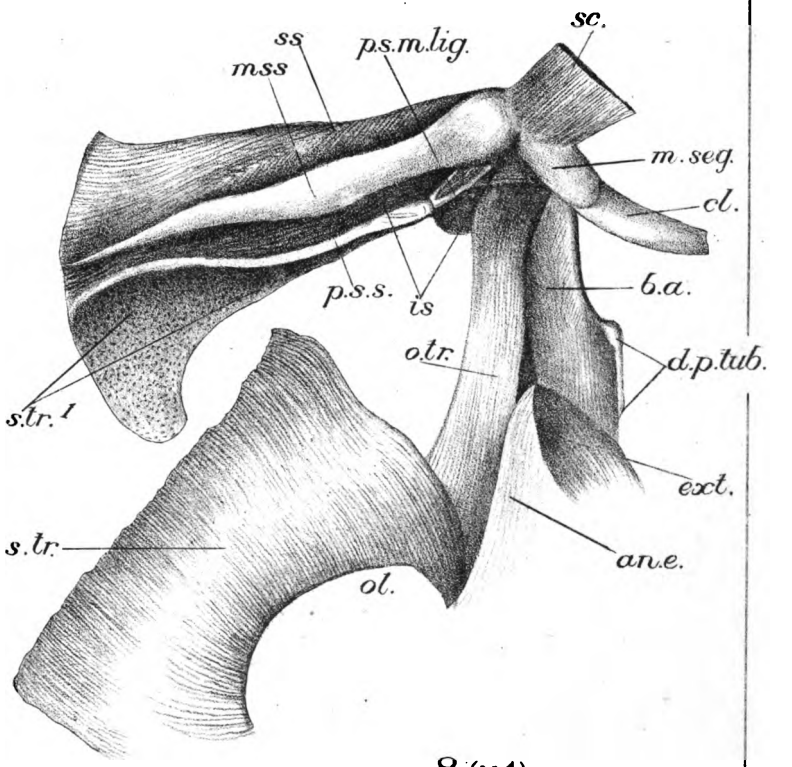

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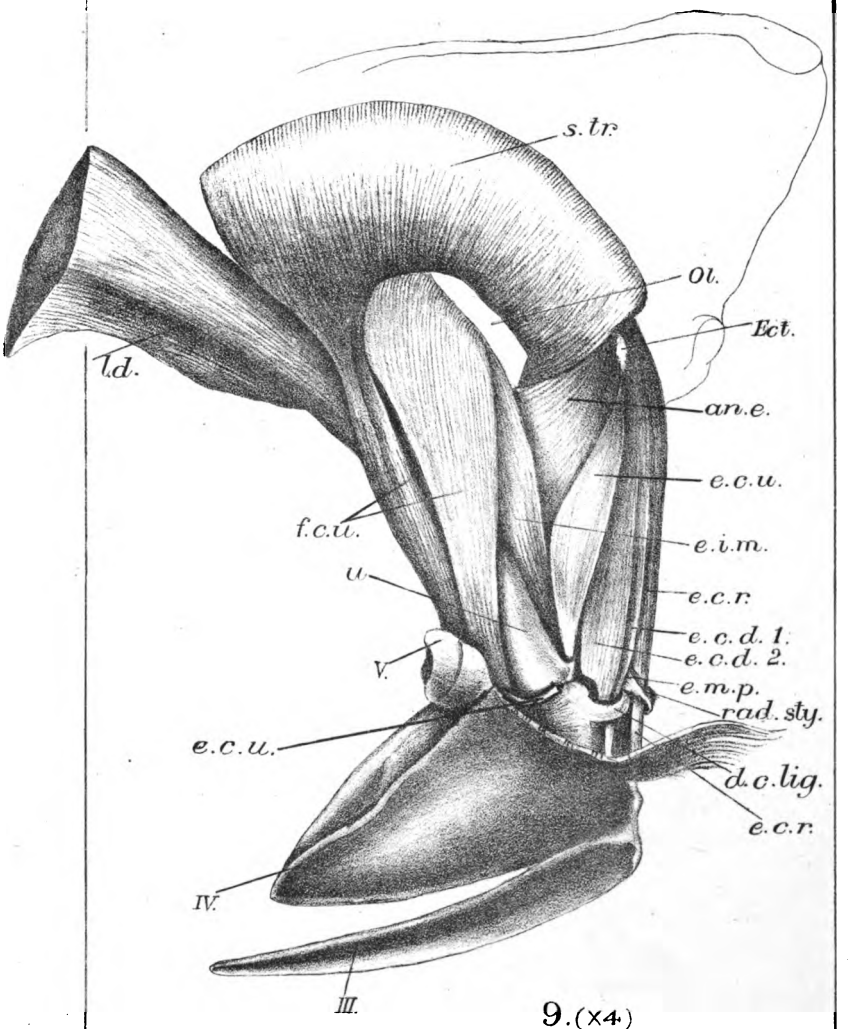

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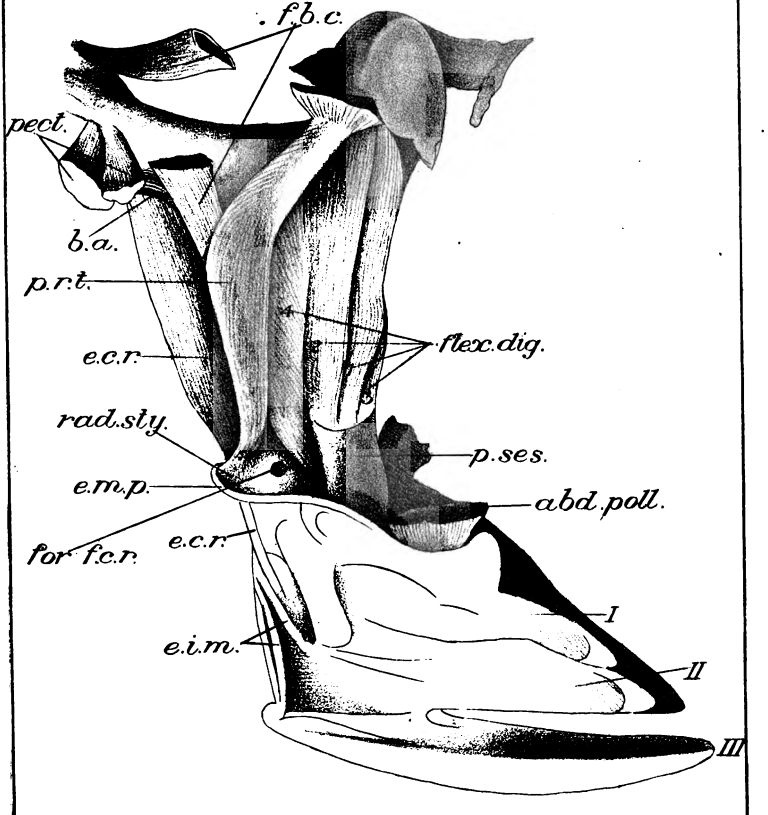

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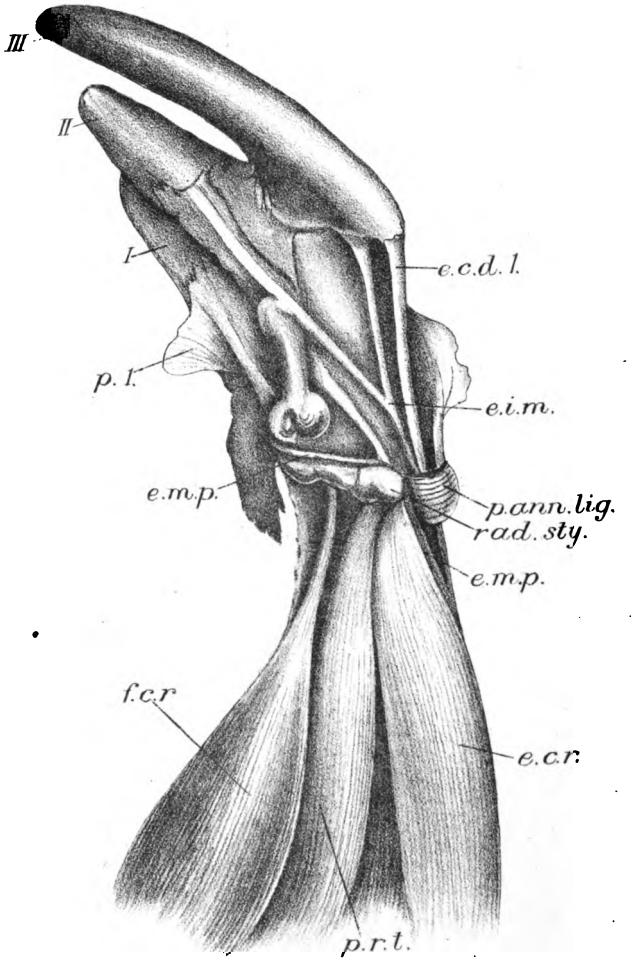

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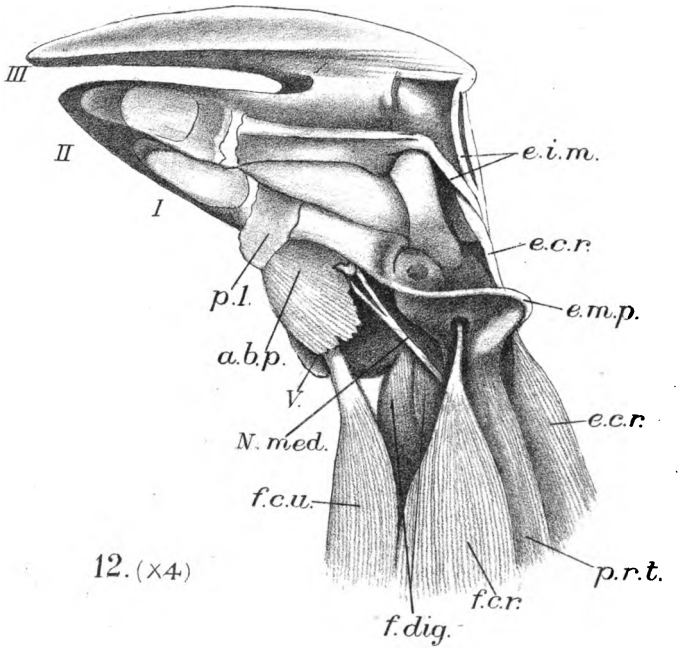

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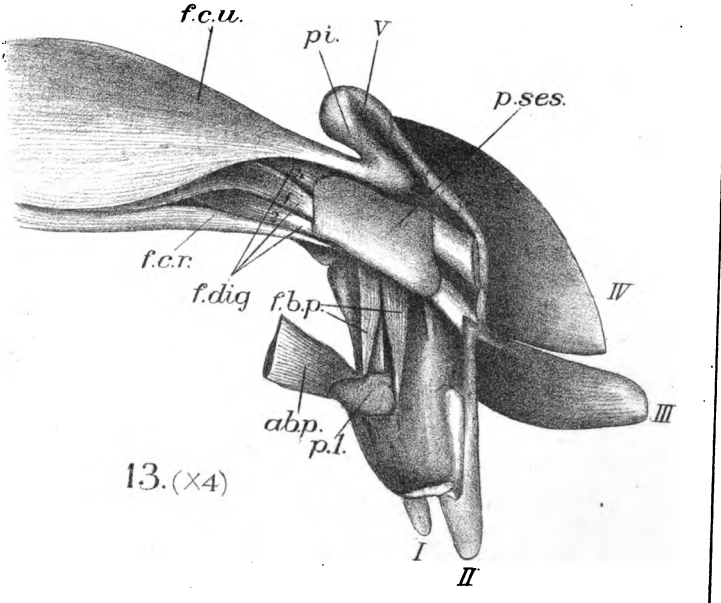

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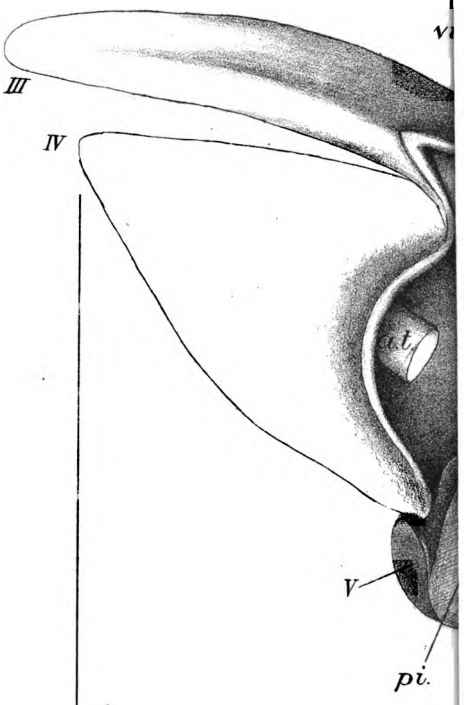

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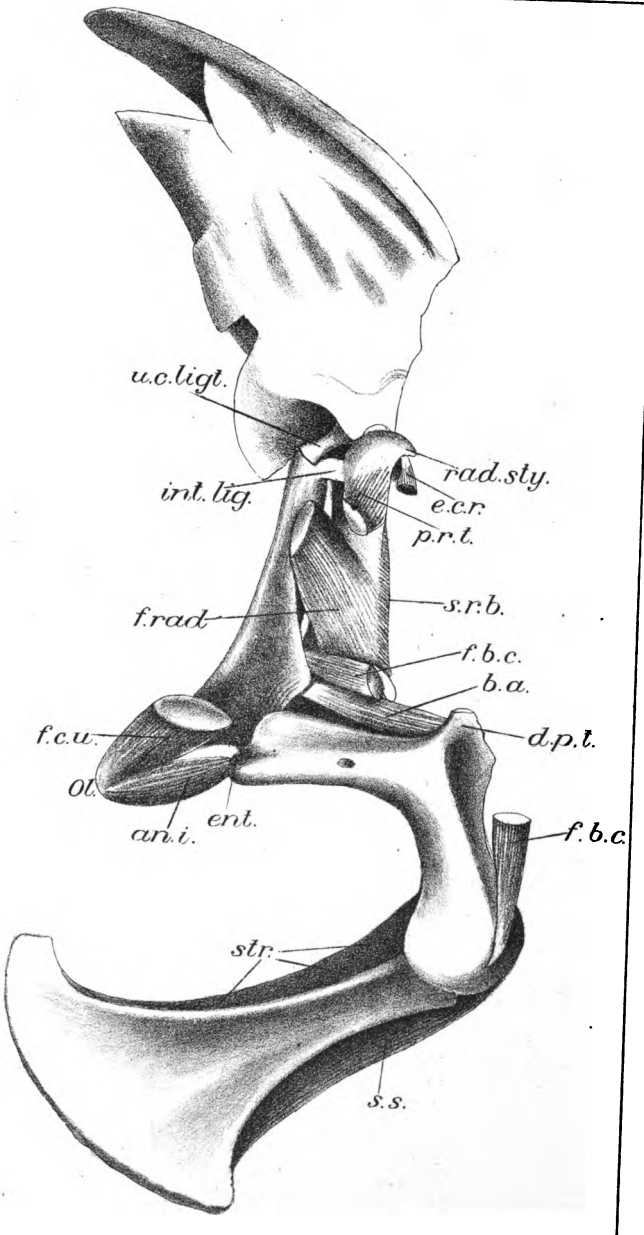

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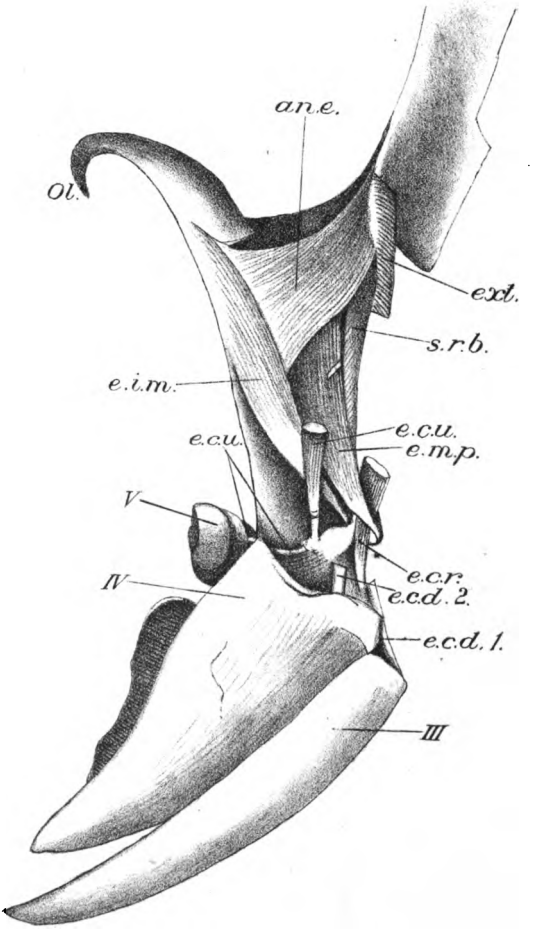

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